

**FOREST DEPARTMENT**



**REVISED WORKING PLAN**  
**FOR THE FORESTS OF**  
**PALAMPUR FOREST DIVISION**

By

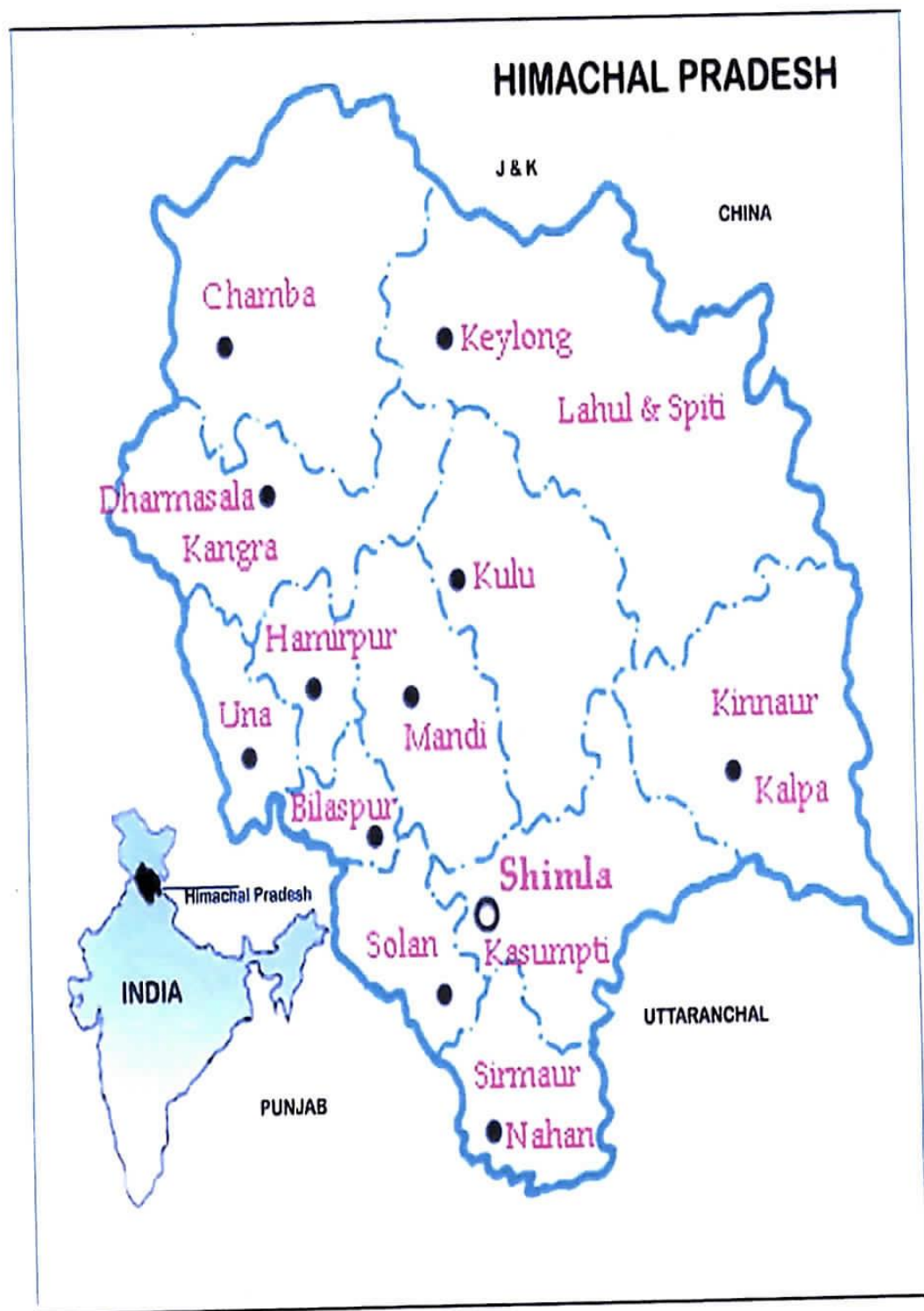
**RAGHUBIR SINGH BANYAL, IFS**

**(2010-11 TO 2024-25)**

**VOLUME - I**

# INDIA

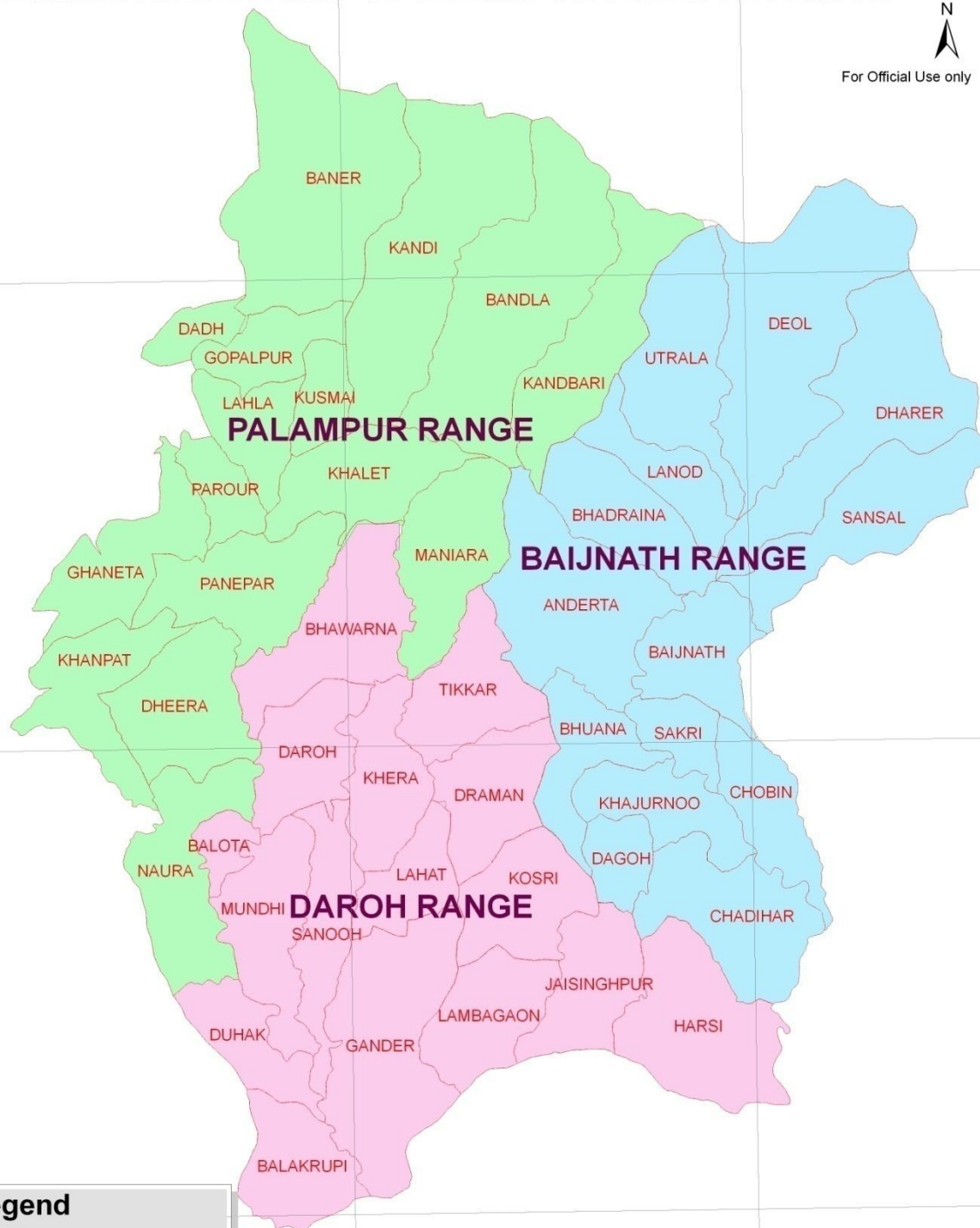




# ADMINISTRATIVE MAP OF PALAMPUR FOREST DIVISION



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## Legend

	PALAMPUR BEATS
	BAIJNATH RANGE
	DAROH RANGE
	PALAMPUR RANGE

1:50,000

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## INTRODUCTION

This Working Plan is a revision of Sh. R.A. Singh's Plan (1981-82-1995-96) and includes all the areas covered under the plan except for the forests of Bir Forest Range as these forests have been declared "Dhauladhar Wildlife Sanctuary" and are now part of Hamirpur Wildlife Forest Division. Mr. R S Banyal was posted as Working Plan Officer in February, 1999. The field work began in February, 1999 and completed in July, 2001.

The emphasis in the present working plan is on conservation and many changes have been made in this plan based on the present crop constitution, silvicultural requirement of the crop, guidelines of National Working Plan Code 2004 and lessons learnt from past management. Accordingly chapters on Activities of State Forest Development Corporation Ltd, Five Years Plans, and Indo-German Changer Eco-Development Project have been included. Keeping in view the guidelines of National Working Plan Code 2004, new working circles namely, NTFP (overlapping) working circle, Forest Protection (overlapping) working circle and Joint Forest Management (overlapping) Working circle have been added. The NTFP (overlapping) working circle gives an exhaustive list of medicinal and aromatic plants/herbs found in this division along-with their uses, which would be very useful for reference in future.

The Working Plan Officer and his staff deserve all appreciation for completing the revision of the plan, despite many constraints like office accommodation residential accommodation for Working Plan Officer and other staff at Palampur. It is worth to mention here that for thirty three new DPF,s constituted by Forest Settlement Officer Palampur from the existing UPF,s and notified as such, new Compartment History files have been constructed de-novo and included in the present plan.

The revised Working Plan has been prepared for a period of fifteen years, commencing from 1/4/2010 to 31/3/2025. The Working Plan under revision expired on 31/3/1996. As there were practically no silvicultural felling during the last plan period, and other prescriptions too were not particularly followed. The removals under salvage marking have been duly accounted hence there is no problem in making the plan operative prospectively. The removals done under salvage marking during 1996-97 to 2009-10 have been accounted and deviation calculated accordingly.

It is expected that the information provided and the prescriptions suggested in the plan would be very useful in deciding the management practices in future.

**(Dr. Tejinder Singh, IFS)**  
**Chief Conservator of Forests**  
**(Working Plan & Settlement)**  
**Mandi, HP.**

## **ACKNOWLEDGEMENT**

The preparation of the revised Working Plan for Palampur Forest Division has been a great learning experience for undersigned. It has been a great team effort and was impossible to be achieved single handedly without the support of field, revenue and ministerial staff posted in the Working Plan Division.

Special thanks are due to the Pr. CCF, H.P. Sh. R.K. Gupta, IFS, Addl. Pr. CCF (Working Plan & Settlement) Shimla, Sh. S C Srivastava, IFS, and Dr. Tejinder Singh, IFS, CCF (Working Plan & Settlement) Mandi, for their guidance, encouragement and help during the final drafting of this Working Plan.

This Working Plan had the opportunity of being supervised by many senior officers of the rank of CFs and CCFs, owing to the frequent changes at these levels. I am highly indebted to Sh. A.L. Sharma, IFS, and Sh. A.K. Gupta, IFS, the then CCFs (Working Plan & Settlement), Mandi, for providing necessary technical guidance and administrative support to the undersigned. The plan owes its present form due to the generous technical support/guidance provided by Sh. Mohinder Pal, IFS and Sh. R.K. Kapoor, IFS, the then CFs Working Plan Dharamshala, especially during field work. Their valuable contributions are gratefully acknowledged in the preparation of this Working Plan.

The ministerial and field staff of DFO Palampur especially the then Range Officer, Bajinath, Sh, Som Prakash Sharma, merit special mention for their whole hearted co-operation in helping out during the field work and making available data from time to time for compilation/updating in this Working Plan.

I would like to acknowledge the valuable contribution made by all the staff of Working Plan Division Palampur. The contribution made by Sh. S.S. Patial and Sh. Anil Mishra Range Officers Working Plan is commendable. Thanks are due to all the field, revenue and ministerial staff of the Working Plan Division particularly Sh. Lekh Raj Sud, Supdt. Sh. Rajiv Sharma, Sr. Asstt, Sh. R S Patial Dy Ranger Sh. Rajender Sharma Patwari, Sh. Swaran Singh Forest Guard for their valuable, sincere and unqualified support in the preparation of this Working Plan.

**(Raghubir Singh Banyal, IFS)**  
**Working Plan Officer**  
**Palampur.**

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## GLOSSARY OF LOCAL TERMS.

(i)

Sr No.	LOCAL TERM	ENGLISH EQUIVALENT
1	Abadi.	A village habitation.
2	Abi.	Irrigated.
3	Adna Malik.	Inferior owner.
4	Ala Malik.	Superior owner.
5	Ala malkiyat.	Superior ownership.
6	Atiala.	A raised platform around a tree.
7	Banjar Jadid.	New fallow. Not cultivated for more than four successive year.
8	Banjar Kadim.	Old fallow. Not cultivated for the last eight successive year.
9	Ban Kharetar.	Hay land in the forest.
10	Ban Muafi.	Forest area owned by villagers.
11	Ban Sarkar (Gair Mehdooda).	Un-Demarcated Protected Forests where land belongs to the individuals or a group of individuals and natural tree growth or planted by Forest Department belongs to the Government.
12	Ban Sarkar Malkiyat (Mehdooda).	Demarcated Protected Forest where land belongs to individuals or a group of individuals and is assessed to land revenue.
13	Barani.	Un-irrigated land, dependent on rain.
14	Bartan.	Rights admitted in Forest Settlement.
15	Bartandars.	Right holders.
16	Bauli or Bauri.	A natural spring of drinking water.
17	Bahand Banjar.	Occasionally cultivated.
18	Burjee.	A boundary pillar.
19	Chak.	Part of land .
20	Chak Ban.	An area maintained as a forest jointly by few tika.
21	Chak dakhli.	An area taken out from the tika and entered into other to facilitate revenue control.
22	Chak kharji.	An area taken out from the tika.
23	Chak Shamlat deh.	A piece of Ban Sarkar area surrounded by Demarcated Protected and Reserve Forest.
24	Chalotu.	A chil pole.
25	Chand.	Boundary pillar of tika.
26	Changer.	A rainfed inferior area.
27	Charand.	Grazing ground.
28	Chillaru.	Dry leaves of chil.
29	Cho.	A seasonal nallah not more than 50 feet in depth.
30	Choharam.	Share of the forest Rakha from the sale proceeds of forest produce.
31	Chowkidar.	A village watchman.
32	Dandi.	A foot path.
33	Darya.	A river.
34	Dhaura.	A white.
35	Dhar.	A ridge.
36	Devta.	A local deity.
37	Drat.	A sickle for cutting bushes and trees.

(ii)		
38	Drati.	A sicle for cutting grasses.
39	Gaddies.	A community of migratory graziers keeping sheep and goats.
40	Gair mumkin.	Barren land under buildings, roads, paths and streams.
41	Gaula.	A pass.
42	Ghanera.	Ruins of village habitation.
43	Gharal.	A shed for cattle and stiring grass.
44	Gharat.	A water mill for grinding purpose.
45	Gohar.	A path.
46	Goharn.	A cattle shed.
47	Goth.	A grazing run.
48	Gujjars.	A community of migratory graziers keeping buffaloes.
49	Hadbast number.	A serial number given to a village, at the time of revenue settlement.
50	Haldun.	Flat fertile ground with deep soil.
51	Har.	A continue stretch of agricultural fields.
52	Haq.	Right.
53	Haq Chuhram.	Zamidari share means one fourth share in sale proceeds of trees and grass etc. in Ban Sarkar areas.
54	Hath.	A linear unit, approximately equal to (18 inches) 45cm.
55	Jagnu.	Chil splinters used for lightning fire.
56	Jagir.	A Estate awarded to an individual by the British for an act of bravery etc.
57	Jagirdar.	Owner of the Jagir.
58	Jamabandi.	Three years record of land maintained by revenue Depptt.
59	Jungle Mehdooda.	Demarcated Protected Forest.
60	Jungle Mehfooja.	Protected forest.
61	Jungle gair mehdooda and mehfooja.	Undemarcated Protected Forest.
62	Karam.	A linear unit equal to 57.5 inches = 146.05 cm.
63	Katha.	A tannin obtained from Khair trees.
64	Khad / Khalla.	A stream perennial or seasonal.
65	Kharetar.	Hay field owned by individuals.
66	Kharif.	Autumn harvest.
67	Khasra.	A field number given on the village revenue records.
68	Khola.	A small valley.
69	Kohli.	A person looks after distribution of irrigation water in the village.
70	Kotwal.	Manager of an area or Station House Officer.
71	Kuhl.	An artificially constructed channel, for irrigation and running watermill
72	Kuhly.	Land irrigation through kuhls.
73	Lahr.	Fields near the habitation.
74	Lamberdar.	A village headman who collects the revenue.
75	Langhana.	A Y-shaped wooden obstruction for cattle but a passage for men in brush wood fence.
76	Makbooja.	Possession.
77	Mali.	Gardener.
78	Mandir.	A temple.



(iii)		
79	Manu.	Current year,s shoot of Bamboo.
80	Marla.	A revenue measuring unit 9 sq. Karam.
81	Mauza.	A unit constituted by a member of tika for purposes of revenue administration.
82	Nadi.	A stream.
83	Nallah.	A small water channel or a torrent not more than 50 ft.in width
84	Naun.	A spring used for bathing washing purposes.
85	Nautor.	Breaking of land for purposes of cultivation off habitation for the first time.
86	Palam.	Irrigated Paddy area.
87	Panch.	A member of Panchayat.
88	Panchayat.	A body of Panches forming a village management committee.
89	Patrah.	Tree fodder.
90	Patwar.	A group of villages forming a Patwar Circle.
91	Patwari.	A revenue official incharge of a Circle.
92	Quila.	A fort.
93	Rabi.	Spring crop.
94	Raja or Rajah.	A ruler.
95	Rakha.	A person appointed for the protection of forests who collects grains from right holders and gets Choram from sale of forest produce for his services.
96	Sarhada.	Trijunction pillar of three tikas.
97	Sarpanch.	A person head of the Gram Panchayat.
98	Sawana.	Gujjar,s encamping and grazing grounds.
99	Shajra.	A village field map.
100	Sawanadars.	Right holders of Sawana.
101	Shamlat.	A village common land.
102	Taluqa.	A management unit fixed by Revenue Depptt.
103	Talab.	Water pond.
104	Thatch.	Grazing grounds in the forests in higher reaches.
105	Tehhdari.	Owner of the all layers of soil.
106	Tehsil.	A sub division of a District made for the purpose of a administration.
107	Terhai.	Closed area.
108	Terni.	Grazing fee of sheep and goats.
109	Tika.	The smallest unit of area forming a part of mauza for purpose of revenue administration (a village).
110	Unclassed.	Ban Sarkar area not declared as Pritected Forests under the I.F.A.
111	Uperla.	Upper.
112	Zamindar.	A land lord.
113	Zamindai share.	out of revenue derived from sale of trees of grass etc. from Ban Sarkar area.

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	<b>LIST OF COMMON TREES, SHRUBS, HERBS AND CLIMBERS</b>		
	<b>FOUND IN PALAMPUR DIVISION</b>		
	<b>TREES</b>		
		(iv)	
<b>Sr No.</b>	<b>Local / Hindi name</b>	<b>English Name</b>	<b>Botanical Name</b>
1	Aam.	Mango.	Mangifera indica.
2	Aerand.	Castor tree.	Ricinus communis.
3	Akhnor.	Horse chest - nut.	Aesculus indica.
4	Akhrot.	Walnut.	Juglans regia.
5	Alsan.		Terminalia tomentosa.
6	Ambara.	Hog Plum.	Spondias mangifera.
7	Amblu.		Antidesma diandrum.
8	Amrud.	Guava.	Psidium guyava.
9	Aru.	Peach.	Prunus persica.
10	Arjan.	The Arjan.	Terminalia arjuna.
11	Badah.	Willow.	Salix alba.
12	Badral.		Machilus duthiei.
13	Badrol.		Machilus gamblei.
14	Badrol / Kharamb.		Machilus odoratissima.
15	Bakain. Drek.	Persian Liliac.	Melia Azedarach.
16	Ban.	White oak.	Quercus leucotrichophora.
17	Badam.	Almond.	Prunus amygdalus.
18	Banni.	Holly Oak.	Quercus glauca.
19	Barh.	Banyan Tree.	Ficus bengelensis.
20	Barthua.		Hymenodictyon excelsum.
21	Bashal.	Willow.	Salix daphnoides.
22	Bashal.	Willow.	Salix dentifulata.
23	Bashal.	Willow.	Salix wallichiana.
24	Behera.		Terminalia belerica.
25	Bhurj.		Betula utilis, B. alnoides.
26	Bil.	Bael Tree.	Aegle marmelos.
27	Bras / Brah.		Rhododendron arboreum.
28	Bukain.		Maesa martiana.
29	Chari / Khiri.	Hornbeam.	Carpinus viminea.
30	Chamar samn.		Glochidion valutinum.
31	Chamror.		Ehretia laevis.
32	Chil.	Chir Pine.	Pinus roxburghii.
33	Chilla.	Aril Orange.	Casearia tomentosa.
34	Chilla.	Aril Orange.	Casearia graveolens.
35	Chirindi.		Litsea umbrosa.
36	Chirindi.		Xylosma longifolium.
37	Dagur.	The Fig.	Ficus hispida.
38	Dhak / Palah.		Butea monosperma.
39	Dhama.		Grewia mainesiana.
40	Dhaman / Beul.		Grewia oppositifolia.
41	Dhamariana.		Grewia laevigata.

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42	Dhao.		Anogeissus latifolia.
43	Dhoop.		Jurinea macrocephala.
44	Dhura, Dudla.	Wild Fig.	Ficus palmata.
45	Diar.	Deodar.	Cedrus deodara.
46	Dudla.	The Fig.	Ficus nemoralis.
47	Duri / Duari.	Hill Toon.	Cedrela serrata.
48	Fhalsh.	The Yew.	Taxus baccata.
49	Gadi kuri.		Bridelia retusa.
50	Galeo.		Cornus macrophylla.
51	Greru / Pariaru.		Erythrina suberosa.
52	Ghian.		Litsea polyantha.
53	Goon.	Horse Chestnut.	Aesculus indica.
54	Guj.	Small Leaved Elm.	Ulmus laevigata.
55	Harar.	Myrobalans.	Terminalia Chebula.
56	Jacranda.	Jacranda.	Jacaranda ovalifolia.
57	Jaman.		Syzygium cuminii.
58	Jamun.	Bird-cherry.	Prunus cornuta.
59	Kachnar.		Bauhinia variegata.
60	Kail.	Blue Pine.	Pinus wallichiana.
61	Kainth.	Wild Madlar.	Pyrus pashia.
62	Kakrain.		Pistacia integerrima.
63	Kalam.		Stephegyne parvifolia.
64	Kamal.		Mallotus Philippinensis.
65	Kandrol.		Ficus cunia.
66	Kanjar.	The Indian Laburnum.	Casia fistula.
67	Kangu.		Flacourtia Ramontchi.
68	Kao / Kahu.	The Indian Olive.	Olea cuspidata.
69	Kaphal.		Myrica nagi.
70	Karal.		Bauhinia racemosa.
71	Karal.		Bauhinia malabarica.
72	Karandle.		Ficus clavata.
73	Karmaru.		Albizzia odoratissima.
74	Karmaru.		Albizzia lulibrissin.
75	Krun.	The Hill Mulberry.	Morus serrata.
76	Kasa Kuri.		Trema politoria.
77	Kathamam.		Eugenia jambolana.
78	Kehmble.		Lannea coromendelica.
79	Kelon.		Cedrus libani.
80	Keor.	Conessi barh tree.	Holarrhena antidysenterica.
81	Khair.	Khair.	Acacia catechu.
82	Khajuy.	Date Palm.	Phoenix sylvestris.
83	Khirk.	Nettle Tree.	Celtis australis.
84	Kharsu.	Brown oak.	Quercus semicarpifolia.
85	Khor / Akhrot.	Walnut.	Juglans regia.
86	Khurmani.	Apricot.	Prunus armenica.
87	Kikkar	Babul.	Acacia arabica.
88	Kinu.		Diospyros tomentosa.

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89	Koi.		<i>Alnus nitida</i> .
90	Koi.		<i>Alnus nepalensis</i> .
91	Kuri / Harsingar.		<i>Nyctanthes Arbor-tristis</i> .
92	Kuhman.		<i>Cordiamacleodii</i> .
93	Larandu.		<i>Meliosma pungens</i> .
94	Lasura.	Obliqua.	<i>Cordia dichotoma</i> .
95	Lasura.		<i>Cordia myxa</i> .
96	Lasuri.		<i>Cordia vestita</i> .
97	Lichi.		<i>Nephelium litchi</i> .
98	Makhan	Tallow Tree.	<i>Sapium sebiferum</i> .
99	Kaklain		<i>Pyrus foliolosa</i> .
100	Mandar.	Maple.	<i>Acer caesium</i> .
101	Maral.	Elm.	<i>Ulmus wallichiana</i> .
102	Morindu / Nirgu.		<i>Elaedendron glucum</i> .
103	Neem.	Margosa Tree.	<i>Azadirachta indica</i> .
104	Nimbu.	Lemon Tree.	<i>Citrus medica</i> .
105	Ohi.		<i>Albizzia stipulata</i> .
106	Pajja.		<i>Prunus padus</i> .
107	Pansara.		<i>Wendlandia spps</i> .
108	Phalsa / Pheruman.		<i>Grewia elastica</i> .
109	Phalsh.	Himalayan Poplar.	<i>Populus ciliata</i> .
110	Phulai.	Phulai.	<i>Acacia modesta</i> .
111	Pipal.	Pipal.	<i>Ficus religiosa</i> .
112	Pula.		<i>Kydia calycina</i> .
113	Puna.		<i>Ehretia acuminata</i> .
114	Putajan.		<i>Putranjiva roxburghii</i> .
115	Rei.	Himalayan Spruce.	<i>Abies pindrow</i> .
116	Rajain / Pardesi.		<i>Holoptelea integrifolia</i> .
117	Ram ban.		<i>Agave americana</i> .
118	Ritha.	Soap nut.	<i>Sapindus Mukorossi</i> .
119	Robinia.	Black locust.	<i>Robinia pseudoacacia</i> .
120	Rumbal.		<i>Ficus glumerata</i> .
121	Sal.		<i>Shorea robusta</i> .
122	Samma.		<i>Engelhardtia colebrookeana</i> .
123	Santra.	Orange.	<i>Citrus aurantium</i> .
124	Sannan.		<i>Ougeinia oojeinensis</i> .
125	Saru.	Pyramidal cypress.	<i>Cupressus torulosa</i> .
126	Safeda.		<i>Eucalyptus citriodora</i> .
127	Safeda.		<i>Eucalyptus spps</i> .
128	Shehtut.	Mulberry.	<i>Morus laevigata</i> .
129	Shamshad.	Box wood.	<i>Buxus sempervirens</i> .
130	Shaur-sharol.		<i>Betula alnoides</i> .
131	Shupa / Shur.	Himalayan pencil cedar.	<i>Juniperus macropoda</i> .
132	Sia / Tut.		<i>Morus indica</i> .
133	Silver oak.		<i>Grevillea robusta</i> .
134	Simbal.	Silk cotton tree.	<i>Bombax ceiba</i> .
135	Siris kala.	Black siris.	<i>Albizzia lebbek</i> .

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136	Siris safed.	White siris.	Albizzia procera.
137	Tali / Shisham.	Sissoo.	Dalbergia sissoo.
138	Tat-palanga.	The Indian Laburnum.	Oroxylum indicum.
139	Tosh.	Himalayan spruce.	Picea simithiana.
140	Trembla.		Ficus roxburghii.
141	Tun.	Toon.	Cedrella toona.
142	Tung.		Pyrus lanata.
143	Toot.	Mulberry.	Morus alba.
SHRUBS			
144	Aira.		Sarcococca saligna.
145	Akha.	Raspberry yellow.	Rubus paniculatus; R. ellipticus.
146	Akha.	Raspberry red.	Rubus biflorus.
147	Akha.	Raspberry black.	Rubus lasiocarpus.
148	Akha.		Rubus niveus; R. macilentus.
149	Amrer.		Viburnum Coriaceum.
150	Badrakhan.		Rubus niveus.
151	Ban Basuti.		Caryopteris wallichiana.
152	Ban Chola.		Flemingia semialata.
153	Ban Malti.	Jasmin.	Jasminum pubescens.
154	Ban Seuol.		Pogostemon plectroides.
155	Bana. Wana.		Vitex negundo.
156	Bankhor.		Spireae Lindleyana.
157	Baobring.	Burn.	Embelica robusta.
158	Ber.		Zizyphus mauritiana.
159	Barari.		Lonicera angustifolia.
160	Barna.		Crataeva religiosa.
161	Barhahi, Bilam.		Limonia erenulata.
162	Basant.		Reinwardtia trigyna.
163	Basant Jari.		Leea aspera.
164	Basuti.		Adhatoda vesica.
165	Batindu.		Stephania elegans.
166	Batindu.		Cissampelos pareica.
167	Bhadhrum.		Gymnosporia royleana.
168	Bharma / Buarina.		Astragalus jacquemontii.
169	Bharmela.		Euonymus pendulus.
170	Bhakal.		Prinsepia utilis.
171	Ceckbar.	The Fever Tree.	Caesalpinia bonducella.
172	Cha.	Tea Plant.	Camellia tucua.
173	Chikri.		Euonymus lacerus.
174	Chata Mendru.		Myrsine africana.
175	Dadar.		Mimosa rubicaulis.
176	Dendru.		Deutzia corymbosa.
177	Dendru.		Deutzia staminea.
178	Dendru.		Itea nutans.
179	Dhakkari.		Clerodendron phlomidis.
180	Dharu / Daru.	Wild Pomegranate.	Punica granatum.

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181	Dhawin.		Woodfordia fruticisa.
182	Dhur bel.		Aspidoptrys wallichii.
183	Dhur malti.	Jasmine.	Jasminum arborescens.
184	Dhura, Dhurbana.		Buddleia asiatica.
185	Dudli.		Hypericum cernuum.
186	Durghari.		Mimosa himalayana.
187	Durpa / Siaru.		Buddleia paniculata.
188	Duesen.		Colebrookia oppositifolia.
189	Fhalsh.	Pencil cedar.	Juniperus recurva.
190	Galodan.		Rhamnus triquetra.
191	Gandhla	Curry Leaf.	Murraya koeningii.
192	Garna, Karonda.		Carissa spinarum.
193	Ghaniara / Kaner.	Oleander.	Nerium odorum.
194	Ghin.		Elaeagnus umbellata.
195	Girgithan.		Sageretia oppositifolia.
196	Guilhain Padari.		Hamiltonia suaveolens.
197	Hium Garna.		Capparia epiaria.
198	Ierni.		Tylophora hirsuta.
199	Jablota.		Jatropha Curcas.
200	Jagru.		Desmodium tiliaefolium.
201	Jajra.		Desmodium pulchellum.
202	Jamni.	Red currant.	Ribes rubrum.
203	Jingli Badam / Thangi.		Corylus colurna.
204	Jingru, Jindru.		Randia tetrasperma.
205	Kahi.		Saccharum spontaneum.
206	Kali Basuti.		Pogostemon placitranthoides.
207	Kala Akha.		Rubus lasiocarpus.
208	Kala Akha.		Rosa macrophylla.
209	Kala Dhao.		Diospyros montana.
210	Kali.		Skimmia laureala.
211	Kanderu / Charka.	The Himalayan Holly.	Ilex dipyrrena.
212	Kaneli.		Lonicera quinquelocularis.
213	Kao thalihana.		Rhamnus purpurea.
214	Kapur minger.		Strobilanthes auriculatus
215	Kashmiri Patha.		Rhododendron campanulatum.
216	Kasmal.	Barberry.	Berberis Edgeworthiana.
217	Kasmal.	Barberry.	Berberis lycium.
218	Kasmal.	Barberry.	Berberis aristata.
219	Kathi / Mattu.		Indigofera Gerardiana
220	Kibal.		Rhamnus virgata.
221	Kikar ber.		Zizyphus oenoplia.
222	Kujh / kunj.		Rosa moschata.
223	Ligga.		Boehmeria regulosa.
224	Loder.		Symplocos crataegoides.
225	Mandhiara.		Andrachne cordifolia.
226	Marak		Bischofia javanica.

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227	Mehndru.	Maple.	Dodonaea viscosa.
228	Nacchar.	Snake stick.	Staphylea emodi.
229	Nargan.	China box.	Murraya exotica.
230	Narr.		Arundo Donax.
231	Padara.		Leptodermis lanceolata.
232	Padara.		Boehmeria platyphylla.
233	Padara.		Ficus infectoria.
234	Padaren.		Wickstroemia canescens.
235	Palakh.		Ficus rumphii
236	Parand.		Loranthus ligustrinus.
237	Parand.		Dendrophthoe falcata.
238	Parad.		Cocculus laurifolius.
239	Paulnu / Phulnu.		Lantana camara.
240	Phak.		Sageretia theezans.
241	Rahan.		Litsaea chinensis.
242	Raina.		Ilex bodiana.
243	Rara.		Randia dumetorum.
244	Rauns.		Cotoneaster bacillaris.
245	Raunsri		Cotoneaster acuminata.
246	Relan / Dhangar.		Acacia caesia.
247	Reru / Karer.		Acacia leucucephalaea.
248	Rudder.		Ficus faveolata.
249	Salorh.		Pueraria tuberosa.
250	Shinn.		Lonicera purpurascens.
251	Siaru.		Debrageasia hypoleuca.
252	Sonan.		Osyris arborea.
253	Sohazard.		Jasminum humile.
254	Tagar.		Tabernaemontans coronaris.
255	Taliani.		Viburnum nervosum.
256	Terni.		Tylophora hirsuta.
257	Teshu.		Rosa sericea.
258	Thor.		Euphorbia royleana.
259	Tirmira.		Zanthoxylum alatum.
260	Triuri.		Spiaea bella.
261	Tung.	Wig Plant.	Rhus continus.
<b>HERBS</b>			
262	Aelon.		Cassia tora.
263	Akk, Dudla.		Calotropis procera.
264	Bhang.	Hemp.	Cannabis sativa.
265	Balsam.		Impatiens scabrida.
266	Balsam.		Impatiens royalei.
267	Balsam.		Impatiens thomsoni.
268	Ban Ajoin.	Wild thyme.	Thymus serpyllum.
269	Ban Kakri.		Podophyllum emodi.
270	Banaksha.		Viola canescens.

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271	Barora, Dudli.		Irachelospermum fragrans.
272	Bharoos		Echinops echinatus.
273	Bichhu-buti.		Urtica dioca.
274	Bichhu-buti.		Girardnia heterophylla.
275	Dainther.		Solanum melongena.
276	Datura.		Datura straminium.
277	Gangi-chhu.		Euphorbia neriifolia.
278	Isbgol.		Plantago tibetica.
279	Karu.		Gentiana kurroo.
280	Linger.		Asplenium polypodioides.
281	Maiden hair fern.		Adiantum venustum.
282	Pudeena.	Mint.	Mentha viridid.
283	Patis.		Aconitum heterophyllum.
284	Pissubuti / Pissumar.		Boenninghausenia albiflora.
285	Puthkanda.		Achyranthus aspera.
286	Res.		Cotoneaster microphylla.
287	Sarap / Chhali.	Cobra plant.	Arsaema Wallichianum.
288	Tulsi.	The Tulsi.	Ocimum sanctum.
288	Ulah.		Solanum verbascifolium.
<b>CLIMBERS</b>			
290	Akash-bel.	Dodder	Cuscuta reflexa.
291	Bakkar bel.		Ichnocarpus frutescens.
292	Bhur-bel.		Aspidoptrys wallichii.
293	Calon / Giloe.		Tinospora malabarica.
294	Chamar bel.		Vitis trifolia.
295	Charki.		Clematis grata.
296	Chibru / Meckrun.		Clematis nutans.
297	Dhanger.		Acacia caesia.
298	Dhullen.		Hydrangea altissima.
299	Dudh khal.		Vallaris heynei.
300	Geor bel.		Clematis montana.
301	Geori bel.		Clematis puberula.
302	Gida dakh.		Vitis latifolia.
303	Jhol.		Clematis gouriana.
304	Katagri.		Euonymus echinatus.
305	Margain.		Clematis buchananiana.
306	Murd bel.		Dregea volubilis.
307	Murina.		Helinus lanceolatus.
308	Ram bel.		Ficus glumerata.
309	Rattak.		Abrus precatorius.
310	Relan.		Caesalpinia sepiara.
311	Sandharan.		Celastrus paniculata.
312	Sansaoni		Jasminum officinale.
313	Sarain.		Jasminum dispernum.
314	Tour.	Camel,s foot climber.	Bauhinia vahlii.
315	Want.		Hiptage madablota.



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		<b>GRASSES</b>	
316	Babar grass.	Bhabar grass.	Eulaliopsis binata.
317	Bans Bauntla.	Male Bamboo.	Dendrocalamus strictus.
318	Dholu.		Chrysopogon fulvus.
319	Dub.	The Dub.	Cynodon dactylon.
320	Lambu.		Heteropogon contortus.
321	Magar.	Thorny Bamboo.	Bambusa arundinacea.
322	Makora.		Cymbopogon martinii.
323	Mohr.		Denrocalamus hamiltonii.
324	Munj.		Saccharum munja.
325	Nal.		Bambusa nutans.
326	Nirgal.		Arundinaria falcata.
327	Nirgal.		Thamnocalamus spathiflorus.

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List of common Animals and Birds		
(xii)		
Sr. No.	English Name	Zoological Name
<b>(1) Carnivore</b>		
1.	Snow Leopard	<i>Panthera uncia</i>
2.	Leopard	<i>Panthera pardus</i>
3.	Leopard cat	<i>Felis bengalensis</i>
4.	Wild cat	<i>Felis chaus</i>
5.	Fishing cat	<i>Felis viverrinus</i>
6.	The Indian fox	<i>Vulpes bengalensis</i>
7.	Jackal	<i>Canis aureus</i>
8.	Hyena	<i>Hyaena hyaena</i>
9.	Red fox	<i>Vulpes vulpes</i>
10.	Yellow throated Martens	<i>Martes flavigula.</i>
<b>(2) Herbivore</b>		
11.	Blue Sheep	<i>Pseudois nayaur</i>
12.	Ghoral	<i>Naemorhaedus goral</i>
13.	Serow	<i>Capricornis sumatraensis</i>
14.	Sambar	<i>Cervus unicolor</i>
15.	Barasibgha.(Swamp deer)	<i>Cervus duvauceli</i>
16.	Thamin	<i>Cervus eldi</i>
17.	Chital	<i>Axis axis</i>
18.	Barking deer	<i>Muntiacus muntjak</i>
19.	Musk deer	<i>Moschus moschiferus</i>
20.	Himalayan Thar	<i>Hemitragus jemlahicus</i>
21.	The Ibex	<i>Capra ibex</i>
<b>(3) Rodents</b>		
22.	Indian Crested Porcupine	<i>Hystrix indica</i>
21.	Indian Hare	<i>Lepus nigricollis</i>
22.	Himalayan Mouse Hare	<i>Ochotona roylei</i>
23.	Threestriped Palm Squirrel	<i>Funambulus palmarum</i>
24.	Fivestriped Squirrel	<i>Funambulus pennanti</i>
25.	Indian Mole Rat	<i>Bandicota bengalensis</i>
26.	Indian bush rat	<i>Golunda ellioti</i>
27.	Indian Field Mouse	<i>Mus budunga</i>
28.	Brown Spiny Field Mouse	<i>Mus platythrix</i>
<b>(4) Primates and Others</b>		
29.	The Rhesus Monkey	<i>Macaca mulatta</i>
30.	The Common Langur	<i>Presbytis entellus</i>
31.	Himalayan Brown Bear	<i>Ursus arctos</i>
32.	Himalayan Black Bear	<i>Ursus thibetanus</i>
33.	Common Otter	<i>Lutra lutra</i>
34.	Mongoose	<i>Herpestes edwardsii</i>
35.	The Himalayan Wease	<i>Mustela sibirica</i>
36.	Indian Wild Boar	<i>Sus scrofa</i>
<b>(5) Lizards, Snakes And Fishes</b>		
37.	The Common Indian Monitor	<i>Varanus monitor</i>

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38.		
39.	<i>The Common House Lizards</i>	<i>Gecko hemidactylus</i>
40.	<i>The Common Indian Krait</i>	<i>Bungarus caeruleus</i>
41.	<i>The Himalayan Pit Viper</i>	<i>Ancistrodon himalayanus</i>
42.	<i>The Indian Cobra</i>	<i>Naja naja</i>
43.	<i>The Rat Snake</i>	<i>Ptyas mucosus</i>
44.	<i>Brown Trout</i>	<i>Salmon truttafaria</i>
45.	<i>Golden Mahaseer</i>	<i>Tor putitora</i>
46.	<i>Rohu</i>	<i>Labeo rohita</i>
47.	<i>Murrel</i>	<i>Ophioce phalus</i>
48.	<i>Eel</i>	<i>Mastacembelus armatus</i>
<b>(6) Birds</b>		
49.	<i>Himalayan Griffon-Vulture</i>	<i>Gyps himalayensis</i>
50.	<i>Indian Longbilled-Vulture</i>	<i>Gyps indicus</i>
51.	<i>Indian Scavenger Vulture</i>	<i>Neophron percnopterus</i>
52.	<i>Himalayan Snowcock</i>	<i>Tetraogallus himalayensis</i>
53.	<i>Chukor Partridge</i>	<i>Alectoris chukar</i>
54.	<i>Snow Partridge</i>	<i>Lerwa lerwa</i>
55.	<i>Hill Partridge</i>	<i>Arborophila torqueola</i>
56.	<i>Grey Francolin</i>	<i>Francolinus pondicerianus</i>
57.	<i>Black Francolin</i>	<i>Francolinus francolinus</i>
58.	<i>Jungle Bush Quail</i>	<i>Perdica asiatica</i>
59.	<i>Common Quail</i>	<i>Coturnix coturnix</i>
60.	<i>Himalayan Monal</i>	<i>Lophophorus impejanus</i>
61.	<i>Kalij Pheasant</i>	<i>Lophura leucomelanos</i>
62.	<i>Koklas Pheasant</i>	<i>Pucrasia macrolopha</i>
63.	<i>Cheer Pheasant</i>	<i>Catreus wallichii</i>
64.	<i>Indian Peafowl</i>	<i>Pavo cristatus</i>
65.	<i>Red Jungle-fowl</i>	<i>Gallus gallus</i>
66.	<i>Blue Rock Pigeon</i>	<i>Columbia livia</i>
67.	<i>Dove</i>	<i>Streptopelia decaoto</i>
68.	<i>Little Brown or Senegal Dove</i>	<i>Streptopelia senegalensis</i>
69.	<i>Slaty headed Parakeet</i>	<i>Psittacula himalayana</i>
70.	<i>Plum headed Parakeet</i>	<i>Psittacula cyanocephala</i>
71.	<i>Blue Winged Parakeet</i>	<i>Psittacula Columboides</i>
72.	<i>Rose Ringed Parakeet</i>	<i>Psittacula krameri. Columboides</i>
73.	<i>Eurasian Cuckoo</i>	<i>Cuculus canorus</i>
74.	<i>Common Hawk Cuckoo</i>	<i>Hierococcyx varius</i>
75.	<i>Indian Cuckoo</i>	<i>Cuculus micropterus.</i>
76.	<i>Asian koel</i>	<i>Eudynamys scolopacea</i>
77.	<i>Tawny Owl</i>	<i>Strix aiuco</i>
78.	<i>Brown Wood Owl</i>	<i>Strix leptogrammica</i>
79.	<i>Mountain Scops owl.</i>	<i>Otus spilocephalus</i>
80.	<i>Indian Roller.</i>	<i>Coracias benghalensis</i>
81.	<i>Common Kingfisher</i>	<i>Alcedo atthis</i>
82.	<i>Common Hoopoe</i>	<i>Upupa epops</i>

83.	<i>Great Barbet</i>	<i>Megalaima virens</i>
84.	<i>Grey headed Woodpecker</i>	<i>picus canus</i>
85.	<i>Scaly bellied Woodpecker</i>	<i>Picus squamatus</i>
86.	<i>Black -rumped Flameback</i>	<i>Dinopium benghalense</i>
87.	<i>Rufous-bellied Woodpecker</i>	<i>Dendrocopos hyperythrus</i>
88.	<i>Black Drongo</i>	<i>Dicrurus macrocercus</i>
89.	<i>Ashy Drongo</i>	<i>Dicrurus leucophaeus.macrocerus</i>
90.	<i>Long-tailed Shrike</i>	<i>Lanius schach</i>
91.	<i>Common Woodshrike</i>	<i>Tephrodornis pondicerianus</i>
92.	<i>Common Myna</i>	<i>Acridotheres tristis</i>
93.	<i>Jungle Myna</i>	<i>Acridotheres fuscus</i>
94.	<i>Rufous Treepie.</i>	<i>Dendrocitta vagarunda</i>
95.	<i>Yellow-billed Blue Magpie</i>	<i>Urocissa flavirostris</i>
96.	<i>Grey Tree pie</i>	<i>Dendrocitta formosae</i>
97.	<i>Eurasian Jay</i>	<i>Garrulus glandarius</i>
98.	<i>Black-headed Jay</i>	<i>Garrulus lanceolatus</i>
99.	<i>Red -billed Chough</i>	<i>Pyrrhocorax pyrrhocorax</i>
100.	<i>Yellow-billed Cough</i>	<i>Pyrrhocorax graculus</i>
101.	<i>Indian Jungle Crow</i>	<i>Corvus macrorhynchos</i>
102.	<i>Black Bulbul</i>	<i>Hypsipetes leucocephalus</i>
103.	<i>Himalayan Bulbul</i>	<i>Pycnonotus leucogeny</i>
104.	<i>Red-vented Bulbul</i>	<i>Pycnonotus cafer</i>
105.	<i>Winter wren</i>	<i>Troglodytes troglodytes</i>
106.	<i>Scaly-breasted wren babbler</i>	<i>Pnoepyga albiventer</i>
107.	<i>Jungle Babbler</i>	<i>Tutdoides striatus</i>
108.	<i>Common Babbler</i>	<i>Tutdoides caudatus</i>
109.	<i>Chestnut-tailed Minla</i>	<i>Minla Strigula</i>
110.	<i>Rufous Sibia</i>	<i>Heterophasia capistrata</i>
111.	<i>White-throated Laughingthrush</i>	<i>Garrulax albogularis</i>
112.	<i>White-crested Laughingthrush</i>	<i>Garrulax leucolophus</i>
113.	<i>Striated Laughingthrush</i>	<i>Garrulax striatus</i>
114.	<i>Streaked Laughingthrush</i>	<i>Garrulax lineatus</i>
115.	<i>Variegated Laughingthrush</i>	<i>Garrulax variegatus</i>
116.	<i>Whiskered Yuhina</i>	<i>Yuhina flavicolis</i>
117.	<i>Dark-sided Flycatcher</i>	<i>Muscicapa sibirica</i>
118.	<i>Slaty Blue Flycatcher</i>	<i>Ficedula tricolor</i>
119.	<i>Grey Headed Flycatcher</i>	<i>Culicicapa ceylonensis</i>
120.	<i>Asian Paradise Flycatcher</i>	<i>Terpsiphone paradisi</i>
121.	<i>Ashy Prinia</i>	<i>Prinia socialis</i>
122.	<i>Striated Prinia</i>	<i>Prinia gracilis</i>
123.	<i>White Tailed Rubythroat</i>	<i>Luscinia pectoralis</i>
124.	<i>Indian Blue Robin</i>	<i>Luscinia brunnea</i>
125.	<i>Golden Bush Robin</i>	<i>Tarsiger chrysaeus</i>
126.	<i>Blue-capped Redstart</i>	<i>Phoenicurus coeruleocephalus</i>
127.	<i>Blue-fronted Redstart</i>	<i>Phoenicurus frontalis</i>
128.	<i>Black Redstart</i>	<i>Phoenicurus ochruros</i>

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129.	<i>Plumbeous Water Redstart</i>	<i>Rhyacornis fuliginosus</i>
130.	<i>Spotted Forktail</i>	<i>Enicurus maculatus</i>
131.	<i>Little Forktail</i>	<i>Enicurus scouleri</i>
132.	<i>Brown Dipper</i>	<i>Cinclus pallasi</i>
133.	<i>Common Stonechat</i>	<i>Saxicola torquata</i>
134.	<i>Grey Bushchat</i>	<i>Saxicola ferrea</i>
135.	<i>Blue-capped Rock thrush</i>	<i>Monticola cinclorhynchus</i>
136.	<i>Chestnut-bellied Rock Thrush</i>	<i>Monticola rufiventris</i>
137.	<i>Blue Rock Thrush</i>	<i>Monticola solitarius</i>
138.	<i>Blue Whistling Thrush</i>	<i>Myophonus caeruleus</i>
139.	<i>Scaly Thrush</i>	<i>Zoothera dauma</i>
140.	<i>White - Collared Blackbird</i>	<i>Turdus albocinctus</i>
141.	<i>Grey Winged Blackbird</i>	<i>Turdus boulboul</i>
142.	<i>Great Tit</i>	<i>Parus major</i>
143.	<i>Green Backed Tit</i>	<i>Parus monticolus</i>
144.	<i>Spot Winged Tit</i>	<i>Parus melanolophus</i>
145.	<i>Rufous-naped Tit</i>	<i>Parus rufonuchalis</i>
146.	<i>Wall Creeper</i>	<i>Tichodroma muraria</i>
147.	<i>Grey Wagtail</i>	<i>Motacilla cinerea</i>
148.	<i>White wagtail</i>	<i>Motacilla alba</i>
149.	<i>House Sparrow</i>	<i>Passer domesticus</i>
150.	<i>Baya Weaver</i>	<i>Ploceus philippinus</i>
151.	<i>Red-headed Bullfinch</i>	<i>Pyrrhula erythrocephala</i>
152.	<i>Brown Bullfinch</i>	<i>Pyrrhula nipalensis</i>
153.	<i>Common Rosefinch</i>	<i>Carpodacus erythrinus</i>
154.	<i>Dark-braested Rosefinch</i>	<i>Carpodacus nipalensis</i>
155.	<i>Himalayan Rock Bunting</i>	<i>Emberiza cia</i>
156.	<i>Crested Buntin</i>	<i>Melophus lathamii</i>
157.	<i>Pine Bunting</i>	<i>Emberiza leucocephalos</i>

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## PALAMPUR FOREST DIVISION STATISTICS AT A GLANCE

(xvi)

1. Total geographical area of the division: 929.60 Km<sup>2</sup>
2. Total forest area of the division: 388.05 Km<sup>2</sup> (41.74 % of geographical area)
3. Location of division:

(i) Longitudes: 76°25' & 77°45' East

(ii) Latitudes: 31°50' & 32°14' North

<b>4.</b>	<b>Category wise forest area.</b>	<b>Area (ha)</b>
	(i) Delimited Protected Forests.	10,620.45
	(ii) Un-delimited Protected Forests.	7,932.16
	(iii) Un-classed Forests.	18,077.59
	(iv) Co-operative Society Forests.	2,175.31
<b>5.</b>	<b>Per capita Forest area of division.</b>	0.12 ha.
<b>6.</b>	<b>Population.</b>	<i>(No.)</i>
	<b>(A) Human:</b>	
	(i) Total population.	3,16,932
	(ii) Rural population.	3,13,293
	(iii) Urban population.	3,638
	(iv) Density of population.	152
	<b>(B) Livestock:</b>	
	(i) Cattle.	1,09,411
	(ii) Buffaloes.	25,435
	(iii) Sheep.	83,763
	(iv) Goats.	66,165
	Misc. Horses, mules and pigs etc.	2,737
<b>7.</b>	<b>Area by Working Circles.</b>	<b>(ha)</b>
	(i) Chil Working Circle.	3,976.60
	(ii) Ban-Oak Working Circle.	3,509.28
	(iii) Plantation Working Circle.	9,480.84
	(iv) Protection Working Circle.	21,838.79
<b>8.</b>	<b>Yield Prescription.</b>	<b>(M<sup>3</sup>)</b>
	(A) Chil Working Circle:	
	(i) Felling Series-I	
	PB-I	2000

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	PB-IV	2500
	(ii) Felling Series-II	
	PB-I	500
	PB-IV	400
	(iii) Felling Series-III	
	PB-I	400
	PB-IV	600
	(B) Ban-Oak Working Circle.	<i>Nil.</i>
<b>9.</b>	<b>Growing Stock (species wise)</b>	<b>(M<sup>3</sup>)</b>
	(i) Chil.	30,24,667.71
	(ii) Deodar.	217.07
	(iii) Fir/Spruce.	2,56,732.46
	(iv) Ban-Oak.	10,06,710.66
	(v) Kharsu.	5,09,005.13
	(vi) Misc. Broad Leaved.	39,03,448.74
<b>10.</b>	<b>Growing Stock (Working Circle wise)</b>	<b>(M<sup>3</sup>)</b>
	(i) Chil Working Circle.	4,80,243.95
	(ii) Ban-Oak Working Circle.	4,57,368.90
	(iii) Plantation Working Circle.	23,29,558.52
	(iv) Protection Working Circle.	54,33,610.40
<b>11.</b>	<b>Total Growing Stock.</b>	<b>87,00,781.77 M<sup>3</sup></b>

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## CHAPTER – I

### THE TRACT DEALT WITH

#### 1.1.1 NAME AND SITUATION: -

This working plan is a revision of the working plan for Palampur Forest Division (1981-82 to 1995-96) by Sh. R.A. Singh. However the area covered by this working plan is not co-terminus with the area of R.A. Singh's plan. The reason is that the sizeable portion stands declared as "Dhauladhar Wildlife Sanctuary" vide H.P. Government notification no. FFE-B-F (6)-9-/99 dated 1.11.1999.

Presently the Palampur Forest Division comprises of three territorial ranges viz. Baijnath, Droh and Palampur. The Uhl range as a whole has been declared as **"Dhauladhar Wildlife Sanctuary"** and stands transferred to wildlife wing of HP Forest Department. The headquarters of the division is located at Palampur (1272 M.S.L.), Distt Kangra. The forests lie in Palampur, Baijnath and Jaisinghpur Tehsils. The total geographical area of the tract is 929.60 square km. and total forest area is 388.05 square km.

The main valley lies at the foothills of Dhauladhar. It is bounded in the South by a mass of rugged and broken hills known as Changer and in the Southwest by Ambuari-Gaggal ridge, which enters this division near Mallan, and traversing in Southeast direction terminates near Balakrupi. The administrative boundaries are bounded in the North by Chamba District; in the East by Mandi Districts; in the South by Hamirpur District (Beas River) and in the West by Dehra and Kangra Tehsils. The boundaries in terms of Forest Divisions are Bharmour in the North, Jogindernagar in the East, Hamirpur in the South and Dharamsala / Dehra in the West.

The tract lies between latitudes 31 degree 50 minutes to 32 degree 14 minutes North and longitudes 76 degree 25 minutes to 77 degree 45 minutes East.

#### 1.1.2. CONFIGURATION OF THE GROUND: -

The whole tract is mostly mountaineous with elevations ranging from 590 meters near Alampur to 5182 meters on the Dhauladhar main ridge, and is dominated by the colossal mountain range of Dhauladhar. On the whole, the tract presents a panorama of rolling hills, high and low, mostly originating from the Dhauladhar. The mean elevation of the main range throughout its course is 4575 meters. The upper reaches of the range are very steep and then there is an abrupt drop of about 900 meters to 1225 meters. Afterwards it breaks up into a series of spurs running into the main valley at a gentle gradient for some distance and finally dropping sharply into the valley. There is no succession of parallel intermediate ranges of gradually decreasing heights and thus, the tract abruptly

divides itself into high and low hills, the later not exceeding 1400 meters altitude. As a general rule, the Southern, Southeastern, Eastern and Northern slopes are very steep and precipitous, but descent on the Western flanks is moderate to steep.

### **1.1.3 GEOLOGY, ROCK AND SOIL: -**

The whole tract forms a part of the Kangra District and lies in the Siwalik-Lesser Himalayan zone and its topography is defined by a series of almost parallel hill ranges separated by longitudinal valleys. The hill ranges rise in height towards North. The higher reaches of Dhauladhar range and upper part of area are snow covered for most of the year.

The various types of rocks found in the area have been classified into certain groups or formations on the basis of their physical characters, mode and period of formation. These groups or formations are generally named after the places where the set of rocks were studied first. In some cases they are also named by their period of formation.

The rock types exposed in the area belongs to Middle Proterozoic to upper Pliocene-Pleistocene in age. The oldest rock exposed in the area belongs to Vaikrita group. The rocks comprises of schist, gneiss and migmatite and lie over Kullu group of rocks along the Vaikrita thrust. Kullu group consists of banded gneiss with thin bands of quartzite, phyllite and garnet biotite schist. The rocks of Kullu group overlie the Mandi-Darla volcanic along Kullu thrust. Mandi-darla volcanic consists of number of basic volcanic flows, light to dark green, massive to foliated basalt. Sundernagar formations comprises of quartzite, phyllite, shale and slate. Shali group mainly comprises of massive dolomite, purple coloured bedded limestone, shale, phyllite and quartzite rocks. The limestone of this group is of cement grade.

The Manjir formation rests uncomfortably over the Vaikrita group of rocks. This formation is represented by pebbly slate, pebbly siltstone, conglomerates, slate and occasional limestone. The formation has often been called as Manjir conglomerate. The sedimentary sequence overlying the Manjir formation has been designated as Katarigali Formation. It is exposed on both the limbs of Chamba syncline with a variable thickness. It comprises of dark to light gray bedded slate, phyllite siltstone, crystalline limestone. Stringers and traces of pyrite are common in these rocks. The old workings of copper mineralisation are associated with the rocks of this formation.

A large granite body extending about five kilometers in width occurs in the middle part of the area. It is called "Dhauladhar Granitoid Complex ". It is emplaced in the Vaikrita group of rocks. It is represented by granite gneiss, streaky banded gneiss, and sugen gneiss and muscovite biotite granite.

Subathu formation occurs as a thin strip comprising of khaki to olive green spoolintery shale, fossiliferous limestone. Dharamshala formation comprises of greenish gray sand stone, purple siltstone, shale and nodular clay. The rocks of Lower, Middle Upper Siwaliks Formations are exposed in this area and occur as several kilometers wide hill ranges. The sand stone of Lower Siwalik is gray, massive and hard. Bands of gray and pink colours concretionary clays occur within the sandstone. The rocks of Middle Siwaliks are gray sandstone with bands of variegated clays. The rocks of Upper-Siwaliks are friable gray to dirty red sandstone with interbands of gray, pink yellow, dirty red clays and conglomerates. Geological map of Palampur division is attached as Plate-I.

**1.1.3.1 FORMATIONS:** - Various Formations are discussed as under: -

**1.1.3.1.1 SUNDERNAGAR FORMATIONS:** - It is exposed between Luni and Sansal khads. This formation forms the base of Shali Formation and comprises of quartzite, phyllite, shale and slate.

**1.1.3.1.2 DARLA- MANDI VOLCANICS:** -The outcrop of this formation are noticed on entire Gogar-Dhar, between Patt and Neugal khad and at places in Sansal, Luni, Nain, Awa khads and Bagh nallah. It consists of number of basic volcanic flows, light to dark green, massive to foliated basalt.

**1.1.3.1.3 SHALI-FORMATIONS:** - This formation is exposed between Sansal.

**1.1.3.1.5 SALOONI FORMATION:** - The rocks included are carbonaceous shale, phyllite, quartzite calcareous sandstone and platy limestone.

**1.1.3.1.6 DHAULADHAR GRANATOID COMPLEX:** - This formation is exposed near Bandla in Palampur Range. It occurs as a large granite body almost five kilometers in with and extends across the Dhauladhar ridge in the North and North-West of Bandla and is emplaced in the Vakrita group of rocks. It is represented by granite, gneiss streaky banded gneiss and muscovite biotite granite.

**1.1.3.1.7 LOWER, MIDDLE AND UPPER SIWALIK FORMATION:** - The rocks of Lower, Middle and Upper Siwaliks Formation are exposed in this area and occurs as several kilometers wide hill ranges with steeper scarps south of Palampur around Pharer, Bhawarna khas and Sulah. Sandstones, grits, conglomerates, clay and silts characterize it. The sandstone of Lower siwaliks is gray, massive and hard. The rocks of Middle Siwaliks are gray sandstone with bands of variegated days. The rocks of Upper Siwaliks are friable gray to dirty red sandstone with interbands of gray, pink, yellow and dirty red clays and conglomerates.

**1.1.3.1.8 SUBATHU FORMATION:** - It occurs as a thin strip comprising of Khaki to olive green spolintary shale, fossiliferous limestone.

**1.1.3.1.9 DHARAMSHALA FORMATION:** - The rocks of this formation are exposed between Khauli and Lanod khads. These rocks are traced from Hara Bagh in Mandi to Sinhuta in Chamba and from the Ora nallah to the Ravi River. It consists of purple and brick red shale and siltstone with alternating beds of grayish green and purple sandstone. The upper part of Dharamshala formation constitutes predominantly fine to course grained micaceous sandstone, green and rare purple shale. Weathering of sandstone of this formation is common.

**1.1.3.2STRUCTURE:** - There are two main structural features of the Himalayas which are described with reference to Palampur Division as under: -

**1.1.3.2.1 THE MAIN BOUNDARY FAULT:** - This delimits the area of Siwaliks from Himalayas. This fault, therefore lies between the pre-Siwaliks and Siwalik Formations and runs for nearly 3000 kilometers throughout the length of Himalayas between Kashmir and Arunachal Pradesh. This fault in Kangra District runs from Chamba to South of Khaniara through Drini, Devi-da-Galu, and Bhagsu Nag. Here the “Jutogh along with overlying Manjiries and “Saloonies” from regional synclinal structure. The rocks, which show Northeasterly, dip in the area South-West of Jalta (confluence of Shah Nal with Ravi river) becomes Westerly dipping in the East and North-East of Jalta. The axis of this incline runs in North, Northwest to South, Southeast direction and is traced from North of Muni-ka-Jot to South of Makori Jot. Carbonaceous rocks of the salooni formation occupy the core of syncline. Both the limbs of syncline are over folded several times giving rise to synclinorium and anticlinorium structure.

**1.1.3.2.2 THE JUTOGH THRUST:** - This is the oldest group of rocks consisting of inter-bedded, greenish gray, brown and black carbonaceous slates, phyllites, schist quartzite and gneisses. The rocks of Jutogh Formation have moved over the younger rocks of Sundernagar Formation and here occupies the highest structural position in the area. The development of Jutogh rocks is best seen about 2 kilometers North of Bandla, where it is found trending in North-West to South-East direction dipping at low angles at North-East. Carbonaceous phyllites in association with limestone are found as lenticular bands and lenses throughout between Deol-khas, Bir, Awa and Neugal khads.

**1.1.3.3SOIL:** - The parent rock exerts a great influence on soil formation, because soil inherits some of its important properties from parent rock. Though climate affects certain changes in the soil derived from a given yet the physical and chemical properties are largely governed by the parent rock.

The Siwalik system rocks yield soils of sandy to loam texture and support low chil and scrub forests in Droh and lower reas of Palampur range. These soils are generally dry and deficient in organic matter.

The gneiss, schist, carbonaceous slates and quartzite etc. of The Jutogh Formation give rise to fairly deep and fertile loam to clay loam, which bears the Fir

/ Spruce and Oak Forests of this division. The boulders of these rocks have been carried down into the lower valleys by the glacial action and the same type of soil is found, in patches in the lower valleys near Andretta and Ghadoral, where Oak forests are present at such lower elevation.

Quartzite rocks of salooni formations are noticed in traces form in Baijnath range, where Deodar occurs sporadically such as U.24 B. Sibbar Nal and U.33 B.Tatwani. It is worth noticing that Deodar does not occur indigenously on the main ridge of Dhauladhar, where strata are composed of mainly slates and shale, instead Oaks and miscellaneous broad leaved species are found.

The hard sandstone of Lower and Upper Dharamshala formations yields deep fertile sandy loam on which chil, mixed with oak and chil forests of the division thrives, such as P.11 B.Sansal, U.4 B. Lanod and U. 23 B. Kharas-Karot etc in Baijnath Range.

The Northwestern slopes have clays alternate with sandstone, when exposed to sun, dries up and fails to support good vegetation. Moreover in certain situations where clay proportion increases, it is liable to water logging it becomes the origin of serious landslips. Alluvial deposits along the stream and river have deep fertile, sandy loam to clayey loam soil where species like khair, shisham etc. flourishes. Such forests occur in Jaisinghpur area of Droh Range.

#### **1.1.4 CLIMATE: -**

Due to wide variation in elevation and configuration, the region experiences a diverse type of climate ranging from sub-tropical at lower elevation in Jaisinghpur and Alampur areas of Droh range to temperate in upper reaches of Palampur and Baijnath ranges. The semi-arctic conditions prevail along the main Dhauladhar during winter months. March, April and October, November months are cool and bright, occasional snowfall occurs in inner valleys. December to February months are very cold and mostly snowfall occurs on higher elevations during these months. May and June are hot and winds laden with dust from plains are a normal feature. The change over from winter to summer is gradual. The temperature begins to rise from middle of April to last week of June or first week of July, when monsoon breaks in. The area receives bulk of annual precipitation from southwest monsoon, beginning by the end of June and lasting till mid September. Drought occurs both in the pre and post monsoon period. Winter rains occur from December to February. Occasional hailstorms from April to June are common. The forest working is not possible during winter months in higher reaches.

Climate exercises a powerful influence in the distribution and growth of species. Moisture and temperature are, by far, the most important site factors for plant growth. For better management of forests, knowledge of rainfall pattern and temperature variations is essential. Meteorological stations are meager in this division. Whatever data is available is either insufficient or incomplete.

**1.1.4.1.RAINFALL:** - Monsoons continues till the end of August or middle of September. During these months rainfall is heavy and climate is moist. These months receive bulk of precipitation in the form of rainfall, which are heavy on the southern slopes of the “Dhauladhars” and progressively decrease southwards in the valley. At higher elevations and in inner valleys, precipitation is more in the form of sleet and snow. Winter rainfall is lighter in extent and intensity. Drought conditions prevail during April, May and early June and again in October-November. Prolonged and severe droughts are common in Changer areas, which have adverse effect on the establishment and growth of regeneration. The available rainfall data of the tract is given in Table 1.1.1.as under:

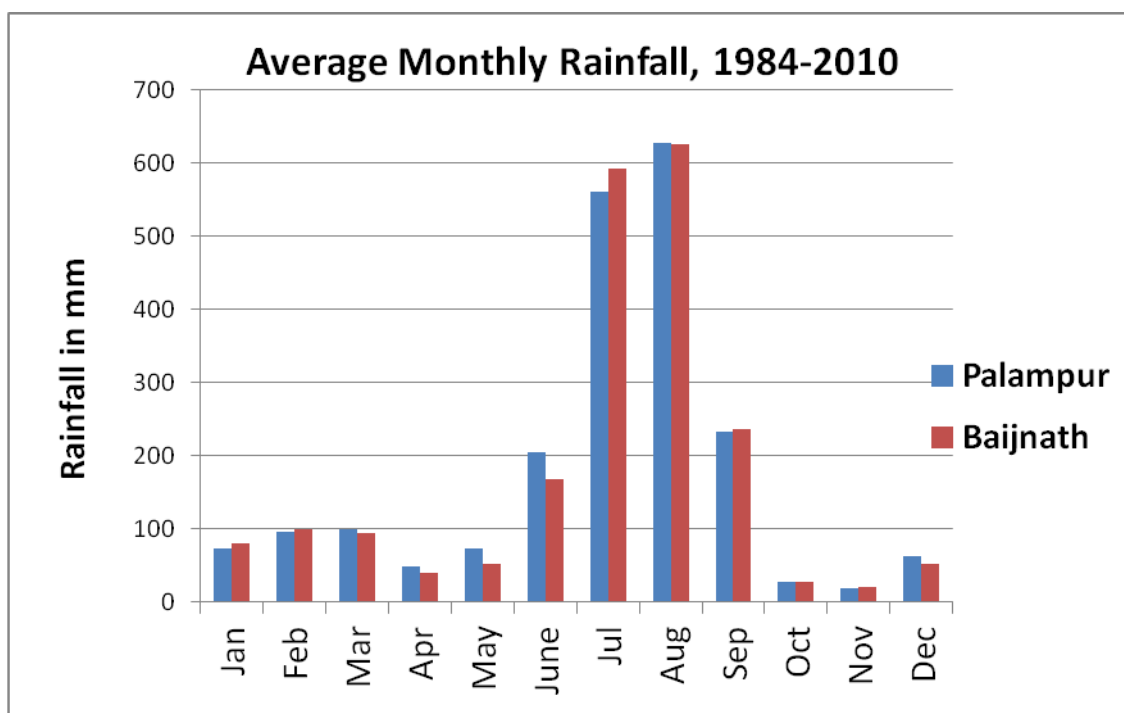
**Table1.1.1. Average monthly rainfall for the year 1984-2010 and rainy days for the years 1995-2010**

Month	Baijnath (1020 M)		Palampur (1272M)	
	Rainfall (mm)	Rainy days	Rainfall (mm)	Rainy days
January.	79.47	6	72.52	6
February.	99.05	8	95.10	8
March.	93.91	7	99.91	8
April.	40.35	5	48.78	6
May.	52.47	6	73.72	9
June.	167.19	13	205.40	13
July.	591.71	26	560.75	22
August.	625.04	28	627.51	23
September.	236.97	16	232.81	14
October.	26.78	3	27.31	3
November.	20.15	2	18.83	2
December.	52.50	2	62.97	3
<b>Total (Annual).</b>	<b>2085.59</b>	<b>122</b>	<b>2125.61</b>	<b>117</b>
<b>Max. (Annual).</b>	<b>2652.56 (1986).</b>		<b>3341.70 (1988).</b>	
<b>Min. (Annual).</b>	<b>1213.00 (1991).</b>		<b>1376.20 (1996)</b>	

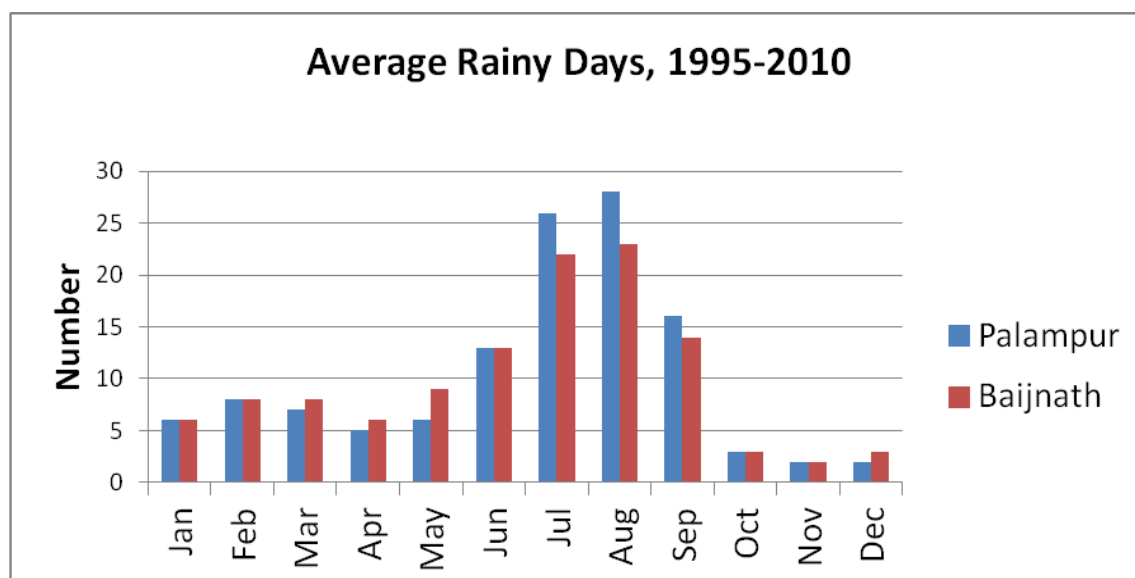
Source: Palampur Forest Division.

The rainfall data and number of rainy days in bar diagram are represented as under in Figure: 1.I and Figure: 1.II respectively.

**FIGURE: - 1.I**



**FIGURE: - 1.II**



**1.1.4.2. TEMPERATURE:** - Temperature varies widely due to great variability in altitude and physical land features. March, April and October, November months are cool and bright, and occasional snowfall occurs in inner valleys during these months. December to February months are very cold. May and June are hot and winds laden with dust from plains are a normal feature. The temperature begins to rise from the middle of April to last week of June or first week of July when monsoon breaks. The temperature in the Himalayan zone is milder during summer but the winters are very cold. The temperature data available from 1996 to 2010 for Palampur is presented as below in Table 1.1.2.

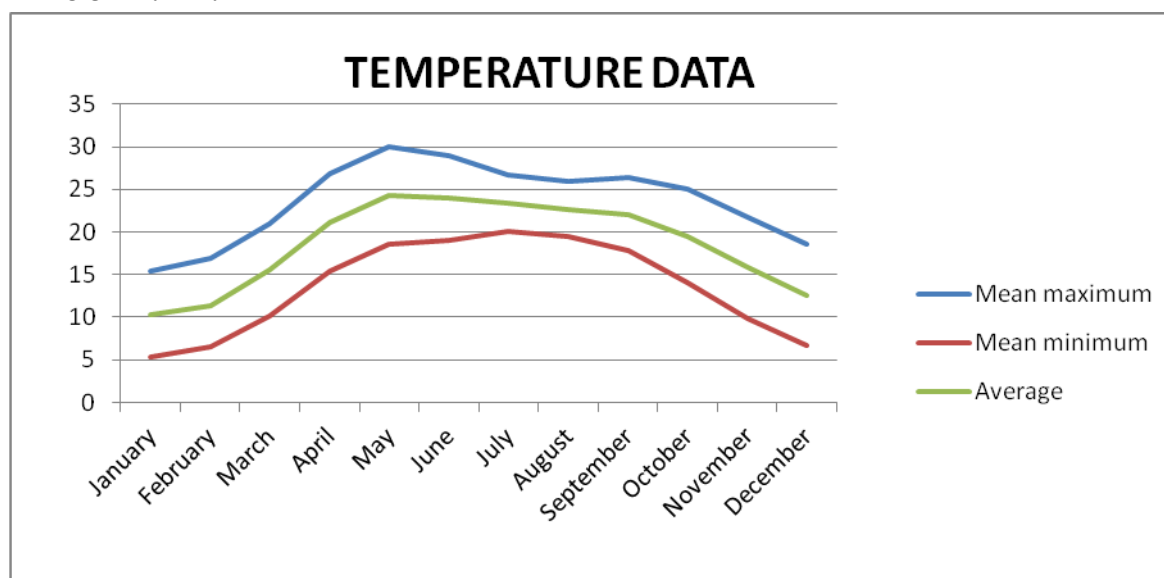
**Table: 1.1.2 Mean monthly temperature in Degree Celsius**

Months	Mean maximum	Mean minimum	Average
January	15.4	5.3	10.3
February	16.9	6.6	11.3
March	21.0	10.2	15.6
April	26.9	15.4	21.1
May	30.0	18.6	24.3
June	28.9	19.1	24.0
July	26.7	20.1	23.4
August	25.9	19.5	22.7
September	26.4	17.8	22.1
October	25.0	14.0	19.5
November	21.8	9.9	15.8
December	18.6	6.7	12.6

Source: C.S.K. Krishi Vishvavidyalaya, Department of Agronomy, Palampur.

The Temperature data in graphical form is represented as under in Figure: 1.III

**FIGURE: - 1.III**





**1.1.4.3 WIND AND HUMIDITY:** - Wind speed, humidity, bright sunshine and evaporation data for Palampur station is available from 1996 to 2010 and presented in Table 1.1.3. The wind speed is minimum from June to August and maximum from January to April. Relative humidity is higher during July to September and least during December and May months.

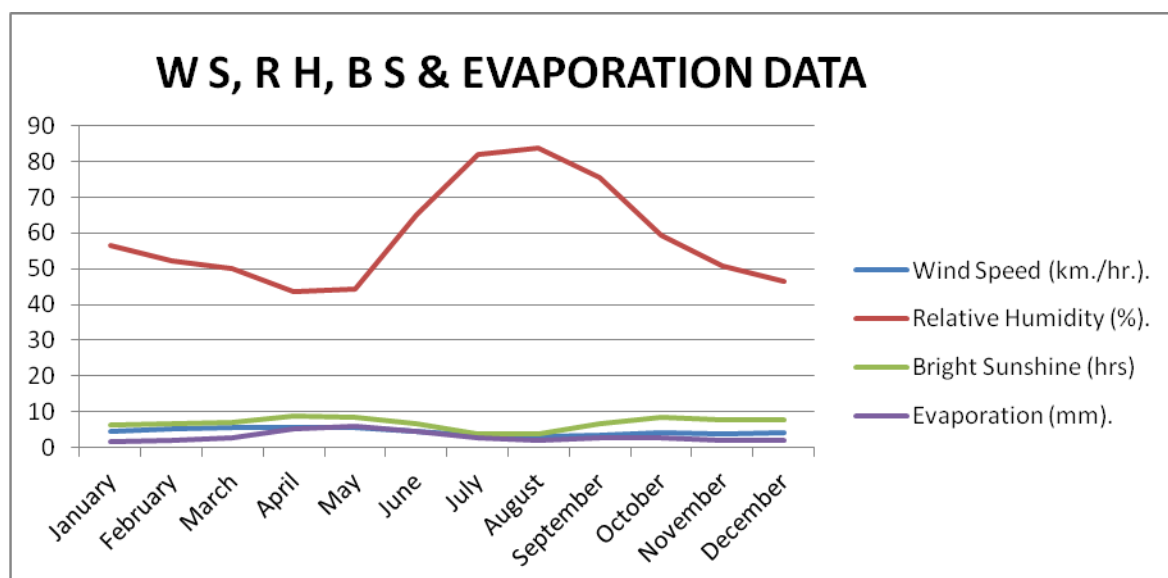
**Table: 1.1.3 Mean monthly data of Wind speed, Relative humidity, Bright sunshine and Evaporation.**

Month	Wind Speed (km./hr.).	Relative Humidity (%).	Bright Sunshine (hrs)	Evaporation (mm).
January	4.5	56.4	6.2	1.5
February	5.3	52.2	6.7	1.9
March	5.7	49.9	7.0	2.7
April	5.6	43.8	8.7	5.1
May	5.6	44.2	8.5	6.1
June	4.5	65.1	6.8	4.4
July	3.3	82.1	3.8	2.6
August	3.0	83.8	3.8	2.0
September	3.6	75.5	6.7	2.6
October	4.1	59.5	8.6	2.8
November	3.9	50.9	7.7	2.1
December	4.3	46.6	7.7	1.9

Source: C.S.K. Krishi Vishvavidyalaya, Department of Agronomy, Palampur.

The mean monthly data of wind speed, relative humidity, bright sunshine and evaporation is represented as under in Figure: - 1.IV.

**FIGURE: - 1.IV**



**1.1.5. WATER SUPPLY:** - The snow-fed streams Baner, Binwa and Neugal receive large quantity of water from melting of snow during the hot weather. Although, these streams are perennial, the flow of water in these varies considerably at different seasons, raging from torrents during rains to insignificant streams during the dry season. The feeders of all the streams in the lower reaches are generally dry except in the rainy season. Due to precipitous slope of the hills and heavy incidence of grazing, run-off is very rapid causing frequent floods in July and August. Agricultural lands are mainly rain fed in the upper reaches and in the Changer areas. But in the main valley, the land is extensively irrigated by a network of irrigated channels (kuhls) taken out of these streams. Forest plantations are not irrigated by any means, though forest nurseries are located at places where irrigation facilities exist. Fertility of the valley is so much dependent on these streams that Neugal and Binwa streams are very rightly considered the lifeline of the valley.

Recently lift and gravitational water supply schemes have been taken up in some areas. The tap water has been supplied in majority of the habitations with the execution of such schemes. Generally there is shortage of water from April to June in Changer areas. With the proper water management, the drinking water requirement of “Changer” area can be fully met with.

Two hydro-electric power projects; namely Baner hydel project on Baner and Binwa hydel project on Binwa, streams have been constructed. Two hydroelectric power projects on Neugal stream, two hydroelectric power projects on Awa khad and two hydroelectric power projects on Luni khad are under construction. Regular supply of sufficient water in these streams, thus, gains added significance. Any dislocation in discharge of these streams / rivers is likely to prove disastrous to these existing as well as up coming projects

#### **1.1.6. DISTRIBUTION AND AREA: -**

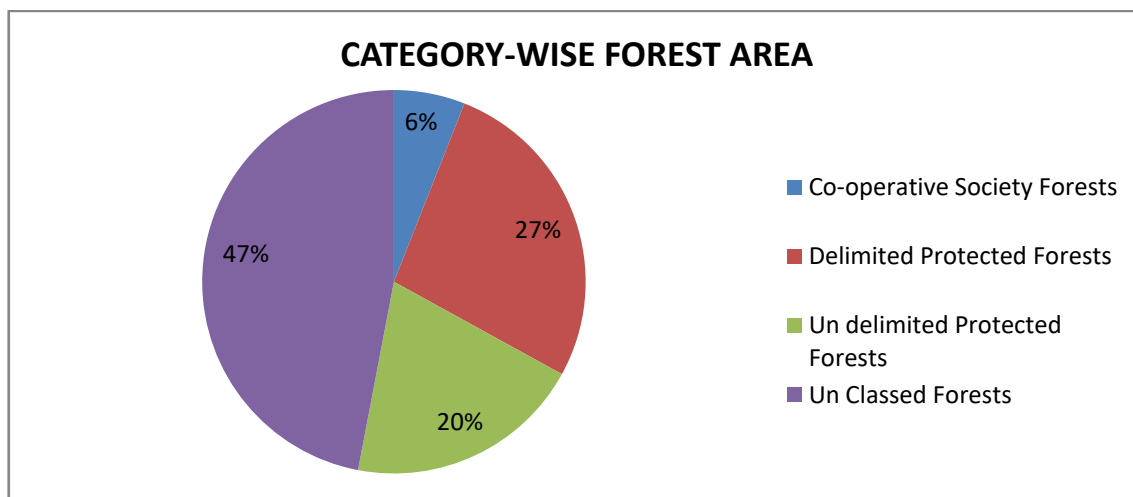
The gross geographical area of the division is 929.60 square kilometers. Forests occupy an area of 388.05 square kilometers i.e.41.74 % of geographical area. The forests do not form a continuous and compact belt but are generally scattered. The Delimited Protected Forests are mainly confined to the main valley. However, the Un-Classed forests are generally located in a compact block on the high hills between Palampur and Deol / Sansal. A complete list of all forests has been appended as Appendix I. The class wise details are given below Table 1.1.4.

**Table 1.1.4 Legal Classification and Range wise distribution of forests.**

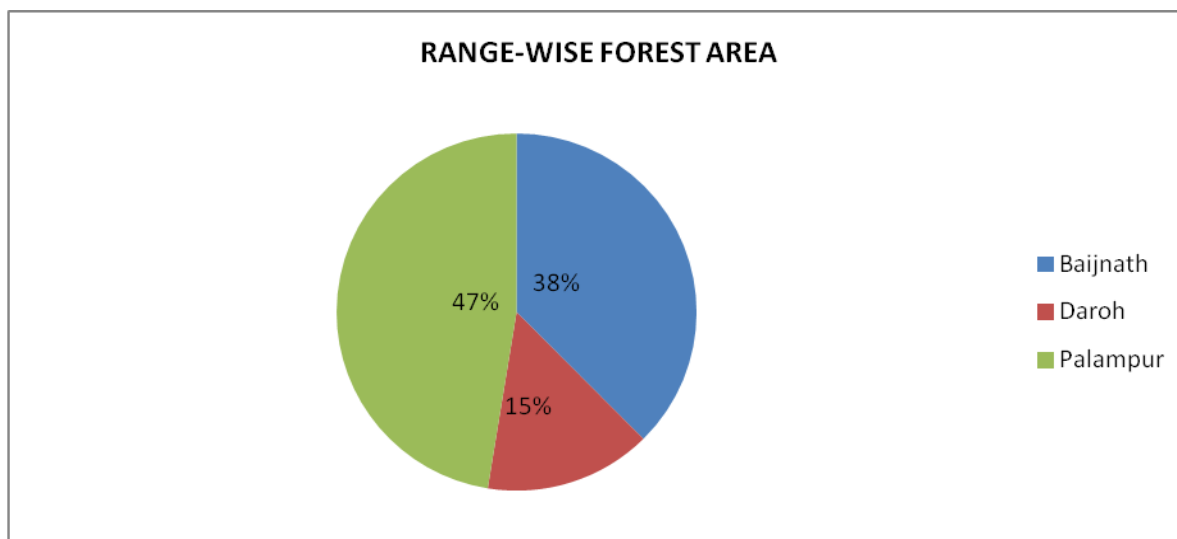
<b>Sr. No.</b>	<b>Legal classification</b>	<b>Area (ha.)</b>			
		<b>Baijnath Range.</b>	<b>Droh Range</b>	<b>Palampur Range.</b>	<b>Total.</b>
1	Delimited Protected Forests.	1,828.37	1,028.77	7,763.31	10,620.45
2	Un delimited Protected Forests.	1,421.05	3,920.18	2,590.93	7,932.16
3	Un Classed Forests.	11,327.09	-	6,750.50	18,077.59
4	Co-operative Society Forests.	-	874.34	1,300.97	2,175.31
	<b>Total.</b>	<b>14,576.51</b>	<b>5,823.29</b>	<b>18,405.71</b>	<b>38,805.51</b>

The category-wise and Range-wise forest area in Palampur Forest Division is represented in pie diagram as under in Figure: 1.V and Figure: 1.VI respectively.

**FIGURE: - 1.V**



**FIGURE: - 1.VI**



#### **1.1.7. STATE OF BOUNDARIES: -**

The boundaries of the Delimited Protected Forests are suitably demarcated with large numbered pillars of loose stone masonry at salient and re-entrant points and with smaller intermediate pillars of similar construction. The internal boundaries of compartments and sub-compartments had been demarcated with small loose masonry pillars, but are not found at present. Included cultivations, however, are not so demarcated. All the Un Delimited Protected and Un Classed Forests, except wherever they adjoin private and Ban-muafi forests are without any boundary pillars. Uncertainties, thus, prevail as regards the external and internal

boundaries of these forests. The maintenance is lacking. As a result, the boundary pillars are missing or dislocated and damaged especially near habitations / cultivations. The boundary registers are incomplete. The forward and backward bearings are inadequately recorded. Neither the exact location of boundary pillars nor the exact linear distances between adjacent boundary pillars are shown. The checks and repairs of boundary pillars as prescribed in the plan have not been adhered. During inspection some of boundary pillars were found missing and badly damaged in many forests. Examples can be cited of **P.15 P. Bhagpur, P.19 P. Lahla, P.43 J. Ban Mandoo and P.44.J. Ban Chambi**. The state of boundary pillars is generally below satisfactory. The boundary pillars in many forests have gone into disrepair and have not been maintained as per quadrennial programme. Generally beat guards are unaware of boundaries of compartments and sub compartments of forests falling in their beats.

#### **1.1.8. LEGAL POSITION:**

**1.1.8.1** In order to have a fair idea of the present legal status of the forests, a detailed historical background of various measures taken in Kangra district as a whole is considered appropriate and is, therefore, discussed as under:

Before commencement of the Mughal Rule, the Raja was the manorial lord of his territory which was a single estate divided into a number of circuits for administrative purposes. The circuits were mere groups of holdings under a collector of rents. All wastelands were the property of the Raja. Every right was supposed to come from the Raja; holding of land was derived from his grant. This system of land tenures continued unchanged, under the Mughal and Sikh Rulers till 1846, when the tract ceded to the British Government.

**1.1.8.2. BARNES' LAND REVENUE SETTLEMENT (1849-1852):** - After the cessation of the territory in 1846, John Lawrence carried out summary settlement. Barnes carried out regular settlement during 1849-1852. Barnes converted each circuit, which were collection of hamlets with patches of cultivation and undefined rights of users in the surrounding wastes, into mauzas and demarcated their boundaries. Landholders of each mauza were converted into a co-proprietary body, and land revenue was assessed at a lump sum for the entire mauza, the payment of which was made the joint responsibility of all the landholders of the mauza. In order to balance the responsibility so imposed, these village co-proprietary communities were conferred with the right to collect and divide amongst themselves certain items of misc. revenue. The most important result of the settlement from forest point of view was that the ownership of the soil of the forests and the waste was transferred to the village co-proprietary body with certain reservations of the rights of **"Gaddi"** shepherds and **"Gujjar"** herdsmen; Govt. retaining only the ownership of the trees of spontaneous growth or planted by it and the right to collect grazing dues from gaddies.

**1.1.8.3. BAN MUAFI AND UNCLASSED FORESTS:** - In 1863, Govt. acquired 1030.53 ha. of waste land, to make it available to the tea planters in ten villages viz. Bandla, Kusmal, Bhagotla, Kandi, Ianode, Deol, Paprola, Bhattu, Jia and Chachian in Palampur tehsil by granting to the village co-proprietary body in each village complete ownership of trees over an equivalent area and by abandoning its right of closure in the remaining waste in the first eight villages but retaining the same in the last two i.e. Jia and Chachian. The forests / wastelands in which Govt. surrendered all its rights were called Ban Muafies and were placed under the control of the Deputy commissioner, the remaining waste where only the right of closure was surrendered (retaining the ownership of trees) was designated as Un classed Forests.

**1.1.8.3. LYALL'S REVISED LAND REVENUE SETTLEMENT (1865-1869):** - Lyall (Sir James) sub-divided the Mauzas (circuits) into Tikas, consisting of one or more hamlets with surrounding waste over which rights were claimed, defined and fixed the boundaries of the Tikas (Tikabandi) and thus, Tika became the unit of management. This was the most important feature of Lyall's operations. A large proportion of waste was included within the Tika boundaries (on the basis of mutual agreement) the ownership of which was vested in the Khewatdars of that Tika and was recorded as Shamlat Tika.

The waste that could not be so partitioned remained the joint property of the whole mauza and was recorded as "Shamlat Deh". Under the latter category falls

(i) All or almost all the larger blocks of waste which were generally formed into separate tika known as "Chakban" followed by the name of the mauza (chakban are tikas containing nothing but or very little else than forest, are the property of the whole mauza) and

(ii) Certain small blocks of especially valuable forests which are shown in the maps of the tikas in which they fall. The proprietary right in "Shamlat Deh" is in proportion to the revenue paid by each tika where as in "Shamlat Tika" it is, as a rule, proportional to the revenue paid by each Khewatdar. However, there is an intermediate case, though not quite common, where the waste is the joint property of a few and not of all the tikas of the mauza. Lyall made certain proposals for forest conservancy, which were never sanctioned and, thus, apart from an ambiguous definition of the lands under Govt. forests and the conservancy clauses of the administration papers, his settlement had little effect on forests.

**1.1.8.4. SCHEME OF ROE AND DUFF (1872-1875); RESERVED AND UN-CLASSED FORESTS:** - On representation made by the Conservator of Forests in 1869, the Govt. appointed Roe (Settlement Officer) along with Duff (Deputy Conservator of Forests) for demarcating absolute Govt. forest areas. The principle to be followed was to acquire absolute proprietary rights in selected areas in exchange for modification of its rights in the remaining wastes. The schemes resulted in the acquisition of complete rights over 3430.52 ha. (8477 acres) in 21 villages of Nurpur Tehsil and 3095.00 ha (7648 acres) in 29 villages in Dehra Tehsil

by way of granting special money and land concessions, by abandoning the right of closure in the remaining wastes and by conferring to the village communities some special rights in such wastes. The land so acquired was notified as Reserved Forests vide Notification no. 111-F and 112-F dated 6<sup>th</sup> March 1879, the remaining wastes over which the right of closure was abandoned were designated as Un-Classed Forests. Rules for preservation, protection etc. of trees in Un-Classed Forests were later on notified vide Notification No. 61 dated 26<sup>th</sup>, 1897, subsequently amended vide Notification No. 994 dated 11<sup>th</sup> January, 1919.

Fortunately, further negotiations on the above lines failed the hazards of demarcation on these principles realized and further demarcation on these lines was dropped. Considering the special money and land concessions and the abrogation of the important right of closure, the result of the measures described above can only be termed as disastrous to the forests conservancy.

**1.1.8.5. ANDERSON'S FOREST SETTLEMENT (1883-1897):** - The regular forest settlement was carried out by Anderson in Kangra proper from 1883 to 1897, which was sanctioned in 1897. The principles on which the demarcation was carried out are laid down in para-5 of the report, which are as under:

**(i)** No change was to be made in the forest management of the forest land either inside or outside the demarcation.

**(ii)** Forest land, which should be permanently maintained as such, was to be separated by demarcation from forestland in which clearance for cultivation might at sometimes be permitted.

**(iii)** There were to be no "give and take" negotiations with the Zamindars nor was the demarcation to proceed with the idea that the forests excluded from it would be made over to the Zamindars and released from all control.

Anderson did not deal with the Reserved and the Un-Classed Forests. The remaining forests were declared Protected and in these, he demarcated a large number of more important areas including the majority of the old Trihais (closed in 1860), which were termed as the "Demarcated Protected Forests", while the areas outside his demarcation came to be known as "Un-Demarcated Protected Forests". The results of Anderson's settlement may be summarized as under: -

**(i)** The formation of 138 blocks covering 54802 ha. of Demarcated Protected Forests, which are to be maintained permanently, as forests (Notification No. 57 dated 26<sup>th</sup> January, 1897 amended by Notification No. 991 dated 11<sup>th</sup> January, 1919).

**(ii)** The formation of Un Demarcated Protected Forests by application of Chapter IV of Indian Forest Act, (Notification No. 58 dated 26<sup>th</sup> January, 1897 amended by Notification No. **992** dated 11<sup>th</sup> January 1919), to all forests and waste land in which the trees had been declared in the revenue settlement record to belong to the Govt. except: -

- (a) The demarcated Protected Forests,
- (b) The Reserved and Un Classed Forests,
- (c) Areas in which the Deputy Commissioner may from time to time sanction appropriation of land for cultivation or for any other purpose,
- (d) Forest and wasteland included in the Jagirs of Rajas of Guler and Dada-Siba (Dehra tehsil).

(iii) The declaration in Notification No. 59 dated 26<sup>th</sup> January, 1897, as amended vide Notification No. 993 dated the 11<sup>th</sup> January, 1919, of 62 species of trees to be reserved under section 30 (a) of the Indian Forest Act, in the Protected Forests. The 62 tree species are as under in Table 1.1.5.

**Table 1.1.5. List of Reserved trees under section 30 (a) of Indian Forest Act.**

Sr. No.	Local Name	Sr. No.	Local Name	Sr. No.	Local Name
1	Chil	22	Barna	43	Khirk
2	Harar	23	Sanam	44	Duri
3	Dhao or Chal	24	Ber	45	Jamu
4	Kakoran	25	Asan	46	Haleo
5	Box	26	Amla	47	Guj
6	Walnut	27	Lasora	48	Kamil
7	Chestnut	28	Patajan	49	Sarin
8	Elm	29	Dhaman	50	Jaman
9	Khair	30	Pariara	51	Simul
10	Tali or Shisham	31	Ohi	52	Bil
11	Oak	32	Phula	53	Kemble
12	Kinu	33	Kao	54	Khilawa
13	Tun	34	Kikar	55	Arjan
14	Sal	35	Karmaru	56	Bado
15	Bamboo	36	Kathamam	57	Puna
16	Kalam	37	Kachnar	58	Badrain
17	Kendu	38	Maple	59	Burj
18	Rajain	39	Spruce	60	Kurumb
19	Bahera	40	Silver fir	61	Dodan
20	Mahwa	41	Mulbery	62	Deodar
21	Keor	42	Rhododendron		

Source: Old Working Plan

(iv) Compilation of a detailed forest record of rights and notification of rules for the exercise and regulation of these rights.

(v) Notification of rules applicable to the Un Classed Forests under **Section 76** of the Indian Forest Act; 1927 (Notification No. 61 dated 26<sup>th</sup> January, 1897 amended by No. 994 dated 11<sup>th</sup> January, 1919).

**11.8.6. GIBSON'S FOREST SETTLEMENT FOR CHHOTA AND BARA BANGHAL (KOTHI KOHAR AND SOWAR):** - This settlement was also carried out on the principles of Anderson's settlement, and results are as under: -

(i) The formation of two blocks (289 ha.) of Demarcated Protected forests to be maintained permanently as forests vide Notification No. 56 dated 6<sup>th</sup> February 1904.

(ii) The formation of Un-Demarcated Protected Forests by the application of Chapter IV of the Indian Forest Act vide Notification No. 57 dated 6<sup>th</sup> February 1904 (superceded by Notification No. 22676 dated 28<sup>th</sup> October 1919).

(iii) The declaration of nine species (Kharsu oak was added to this list later, in 1933 to make it ten species) of trees to be reserved under section 30 (a) of the Indian Forest act, in the Protected forests. These species are tabulated below in Table 1.1.6.

**Table 1.1.6 List of Reserved trees under section 30 (a) of Indian Forest Act in Chhota & Bara Banghal.**

Sr.No.	Local Name	Sr. No.	Local Name
1	Kail	6	Mandar
2	Akhrot	7	Tosh
3	Maral	8	Rai
4	Khanor	9	Duri
5	Deodar	10	Kharsu

Source: Old Working Plan

It may be emphasized that the Demarcated Protected Forests were composed of the wastes of one or more Tikas or Mauzas (Shamlat Deh) but the Un-demarcated Protected Forests comprised only of the wastes of the Tika concerned (Shamlat Tika).

**1.1.8.7 MIDDLETON'S REVISED LAND REVENUE SETTLEMENT (1913-1919):-** The identification and record of areas on which the trees were the property of the State was the most important forest matter dealt with in the course of this settlement. In spite of attention to details, which characterized the earlier land revenue settlements, the records were not quite clear as to the field numbers on which the trees belonged to the Government. Anderson's Forest Settlement though resulted in a clear record of rights in the Demarcated Protected Forests but did not remove the difficulty of ascertaining the areas outside the demarcation in which the trees were the property of the Government. Middleton carried out this verification with the assistance of Mitchell who prepared "Tree Files" by tracing each field number to Lyall's record and declaring the propriety right of Government or otherwise in terms of field numbers. In doing so, the title of Government to trees in small-scattered areas not exceeding 4 acres (4 acres rule) was generally abandoned. The Government forests (Ban Sarkar) areas were, thus clearly defined and the matters were brought on a far more satisfactory footing than ever before, and one of the main difficulties of Revenue and Forest Administration was removed.



In the body of the Record of Rights, wherever a field number in which the Government owns the trees occurs, a note to that effect was recorded in the remarks column at the end of the record, forming a part of the “Jamabandi”. In addition, a Forest Register for each Tehsil showing the field number and the area of each class of forest in every Tika was drawn up.

**1.1.8.8. MITCHELL AND WALTER’S ROTATIONAL CLOSURE SCHEME(1919):** -The forests included in the earlier demarcation and closed to grazing continued to improve but those outside the demarcation deteriorated steadily and were in danger of extinction. Realizing the true state of affairs, the Government, in order to save the forests from irretrievable damage, issued orders in 1913 for the preparation of a scheme of “Rotational Closure” of the forests. The Inspector General of Forests, who toured the District in 1915, also suggested to the Government that a special Revenue Officer along with a Forest Officer should delimit the whole area that was proposed to be closed under the Indian Forest Act. Accordingly, Mitchell and Walter were deputed for the purpose and their operations resulted in a scheme known as “Mitchell and Walter’s Rotational Closure Scheme”.

A question may be raised as to why a fresh delimitation of areas to be subjected to rotational closure was felt necessary, when there existed already a good number of Demarcated Protected Forests. It was for the reason that it was not possible to consider the then existing Demarcated Forests as the basis for the new system of “Closure Series” on account of the following three main reasons: -

**(i)** The Government’s right of closure extended equally to both, Demarcated and Un-demarcated Protected Forests and contiguous with the Demarcated Forests, there were pieces of Un-demarcated Forests to the closure of which the objection was less as compared to the closure of most of the Demarcated Forests.

**(ii)** The Demarcated Forests were, in many cases, large and included wastes taken from many Tikas and extended often to more than one Mauza. The Tikabandi of the wastes was carried out on the basis of the grazing ground mainly used by each Tika concerned and though it was rare to find a case in which a Tika grazed exclusively on its own waste and had no mutual arrangement with its neighbours, still it was obvious that under conditions which render a Tikabandi possible the Closure Series could not be very much larger than the waste of each Tika.

**(iii)** The Demarcated Forests included a considerable extent of land which could never be closed without great hardship to the right holders. The best instance is that of the large “Chakbans” which are Tikas containing mainly forests and are the property of the whole Mauza and not merely of the Khewatdars of the nearest cultivated land. Obviously, these were the tracts, which conformed to the principles of the demarcation in Anderson’s Settlement, and they were, as a rule, accepted as Demarcated Protected Forests as they stood. But when the boundaries were fixed at Lyall’s Settlement, in the majority of case no wastes were left in the Tikas

bordering the chakbans with the result that their cattle entered direct from the houses into the Demarcated Forests, which contained the various paths from one part of grazing land to another as well as to places like watering places.

In view of the above, the Closure Series had to be constructed without reference to the old demarcation. Some Un demarcated Forests had to be included and some Demarcated Forests had to be excluded from the new delimitation. Thus, for the selection of areas to be subjected to the scheme of Rotational Closure, an amalgamation of the Demarcated and Un Demarcated Protected Forests took place. The areas so delimited which may be composed entirely of Demarcated Protected, or entirely of Un Demarcated Protected or of both, were termed as Delimited Protected Forests (D.P.F.s).

There exists some misunderstanding between the terms “delimitation” and “Delimited Forests”. The term “delimitation” was used only to avoid any confusion with the previous act of “demarcation”. The latter is a legal terminology signifying a forest distinct from the two classes of forests (Demarcated and Un demarcated) resulting from the new act of “Delimitation”. So to say, the former is merely an executive act having no legal significance whatsoever. The “Demarcated Protected” forests remained under the charge of the Forest Department while some legally Demarcated Forests excluded from the delimitation were transferred to the Deputy Commissioner’s control along with other remaining forests.

**1.1.8.9. SUMMARY OF THE RESULTS OF THE SETTLEMENT AND THE SCHEMES:** - The net result of various measures described above was to create the following categories of forests: -

**(i) BAN-MUAFI FORESTS:** - Which were the absolute, common property of the village proprietary bodies.

**(ii) RESERVED FORESTS:** - Which is the absolute property of the government, practically free of rights.

**(iii) UN CLASSED FORESTS:** - Where trees belong to the Government, but no closures can be made without the consent of the people.

**(iv) DEMARCATED PROTECTED FORESTS (JUNGLE MEHDOODA):** - In which appropriation of land can never be granted.

**(v) UN-DEMARCATED PROTECTED FORESTS (JUNGLE GER MEHDOODA):** - In which breaking up of land could be sanctioned by the Deputy Commissioner.

**(vi) DELIMITED PROTECTED FORESTS (JUNGLE MEHFUJA):** - which are to be subjected to the rotational Closure Scheme and are to be permanently maintained as forests.

**1.1.9. THE CO-OPERATIVE FOREST SOCIETIES:** - The condition of the Delimited Protected Forests, being under proper management by the Forest Department, improved and was quite satisfactory, but the Un classed and the Un delimited Protected Forests suffered badly. Indiscriminate fellings, lopping, grazing, browsing etc. resulted in serious loss of soil cover and accelerated erosion especially in the lower foothills. In order to arrest further deterioration of these forests, the Government decided, in 1938, to associate the villagers in the forest management by entrusting them the management of all government forests with in each village estate, generally a Mauza, provided they agreed to manage the remaining un-managed forests also under regular Working Plans through the agency of the Co-operative Societies.

The scheme of the Co-operative Forest Societies was sanctioned by the Government vide letter No. 568-Ft. dated 27<sup>th</sup> February 1940 wherein the detailed administrative aspects of this new institution were outlined. The detailed organizational set up, the byelaws etc. are given in **Appendix-XXVII**. The scheme was sanctioned initially for a period of five years and the first Society was registered during November 1941. The scheme was reviewed and extended, from time to time, till March 1971. Nothing has been done to extend the scheme and renew the registration of these societies since then.

**1.1.10. FORSET SETTLEMENT OPERATIONS IN PALAMPUR DIVISION:** - The work Forest Settlement Operations in Palampur Forest Division under Palampur Settlement Unit were started in May 1993 and it was envisaged to:

- (i) The areas declared as Protected forest under Indian Forest Act and duly covered by a notification be entered in the Revenue records.
- (ii) The areas declared as Protected forests and covered by 1952 Notification and other areas covered earlier under notification of Punjab and erstwhile Princely States, may be surveyed/measured and demarcated and notified as DPFs.
- (iii) The areas of existing UPF's and Un-classed forests / other category forests may be constituted in to DPFs.

Many Un-delimited Protected Forests and few Un classed Forests (those entered as Jungle MaihfoojaGair Mehdooda in revenue record) have been declared as Demarcated Protected Forests after the settlement of rights. A total of 228 forests covering an area of 21,908 ha have been demarcated on the ground and 133 forests with an area of 11919 ha stand duly notified vide Notifications No. M.F.E.V. (F) 5-4 / 95 Dated 5.8.1996 and No. FTS-B-F (5)-4/2002 dated shimla 3.11.2003 but their entries in the revenue record as D.P.F's are yet to be made. The settle work of remaining 95 forests comprising an area of 9989 ha is at different stages of determination of rights. In total 9249 Boundary Pillars and 2205 Chak Pillars are to be constructed in these Demarcated Protected Forests.

Furthermore, there are many good plantations raised on wastelands under various schemes in the past especially the Soil Conservation, and these have now become well stocked forests particularly in Daroh range (Nagban forest) and

Chadhiar Block of Baijnath range. It has become necessary to notify these areas as DPFs to bring them under the purview of Indian Forest act. The list of forests notified as D.P.Fs is attached as **Appendix-XVII**.

#### **1.1.11. THE H.P. VILLAGE COMMON LANDS (VESTING AND UTILISATION)**

**ACT 1974:** - With the enactment of “The Village Common Lands (Vesting and Utilization) Act, 1974” the ownership of the soil which was earlier with the village proprietors has been vested in the Government. As a result of this, the Ban Muafi forests, which were the property of the villagers, have now become Government property. Similarly, the soil of the UnClassed and the Protected Forests which belonged to the people (Government having proprietary rights only on the trees of spontaneous growth or planted by it) is also vested in the Government, and these forests have also become the absolute property of the Government, under the possession of revenue Department. The Government decided to transfer the forest areas to Forest Department for better management. Forest Department issued some guidelines in connection with the handing and taking over of such areas vide letter No. Fts. (F) 7-1/82 dated the 20<sup>th</sup> April 1982. The Revenue Secretary vide letter No. Rev. 2.F (1)-1/80 dated 20<sup>th</sup> July 1985 directed the complete handing over of forest areas with the change of revenue entries in favour of Forest Department by mutation wherever necessary with the assurance that the areas so transferred is not encroached upon by private individuals. With the above directions of the Revenue Secretary, the Forest Department automatically became the owner of such transferred lands. The forest department have taken the possession of such lands and raised number of plantations in some of these areas.

**1.1.11.1.** The legal position of Shamlat and ceiling land forests changed with the issue of letter No. Rev. 2F (I)-1/80 dated 29<sup>th</sup> July, 1986 from the Revenue Secretary to H.P. Government which envisaged to follow the following procedures: -

**(i)**Where the land i.e. village common land vested in the Govt. under the Village Common land Vesting and Utilisation Act, 1974 and the surplus areas vested in the Government under the H.P. Land holding Act, 1972 has been recorded in the revenue records clearly as “Forest” (and not as “Van Sarkar” “Charand Jungle Dehati” or “Charand Drakhtan” etc. etc.), such land shall be transferred with possession to Forest Department if not already done.

**(ii)**In respect of land under trees but recorded otherwise, the transfer shall be confined to the tree alone. The control over the trees by the Forest Department shall be reflected in revenue record in the remarks column of the Jamabandi stating therein that the trees are under the control of Forest Department. Neither the ownership nor the possession of the land shall be shown as that of this department. Forest Department shall be told at the time of formal handover that the land is “non forest areas” and their control over it shall be confined to trees only.

(iii) The above procedure shall be meticulously observed so that in due course the land under these trees, is not claimed / alleged to be within the purview of the Forest Conservation Act, 1980.

The above instructions were applicable to all such cases where transfers had already been made in the past. If in any of these cases the Forest Department had been entered in the column of possession, it was to be reviewed so that only the control of the trees over the areas involved is found mention in the remarks column of Jamabandi. This transfer is strictly subject to the condition that whatever rights on the produce of the forests or the land containing trees accrued or were accruing to the local people in these lands, would continue as heretofore.

**1.1.12. THE FOREST (CONSERVATION) ACT, 1980:** - With the enactment of "The Forest (Conservation) Act, 1980" no forestland can be diverted for any non-forestry purpose without the permission of the Government of India. As a consequence of this, the earlier position regarding breaking up of land for cultivation in the Un-classed and Un-demarcated Protected Forests with the permission of the Deputy Commissioner has been completely altered. Thus, the distinction amongst the Demarcated Protected, Un-demarcated Protected and Un-classed forests, as far as the breaking up of land for cultivation is concerned, has been disappeared. Details of these cases are furnished as under in Table 1.1.7.

**Table: 1.1.7 Forest Area Diverted Under the Forest Conservation Act, 1980.**

<b>Sr. No.</b>	<b>Name of Forest</b>	<b>Name of activity</b>	<b>Area diverted (ha)</b>	<b>Govt. of India Order No.</b>
<b>1</b>	U.5 P.Deol.	Fibre Board Factory.	2.68	G.O.I. No. 08-169/83 F.C. Dated 13.5.83.
<b>2</b>	P.16 P.Supdhar & U.P.3 P.Diala.	Baner Hydel Project.	9.11	G.O.I. No. 08-23/87. F.C. Dated 3.12.87
<b>3</b>	C.F.S. Punner-Dehan. (U.P.Bagh).	132 K.V. Station Dehan.	0.99	G.O.I. No. SCO-F-No. 9-100/93 ROC Dated 3.9.93.
<b>4</b>	C.F.S. Maranda-Bhangiar.	Entry to Petrol Pump.	0.008	G.O.I. No. 8-298/88F.C. Dated 26.7.88.
<b>5</b>	U.P.31 P. Baghidhar. Comptt.- 4	132 K.V.S.C.T.R. Transmission line.	1.47	G.O.I. No. 154/89 F.C. Dated 9.8.99.
<b>6</b>	U.11 P Kandrachu Nal, U.12 P. Baghnal	Road for HEP Neogal.	2.0745	G.O.I. No. 9-913/2001-ROC/1163 dated 20.7.2000.
<b>7</b>	U.9 P. Ukhli-Muhli.	Neogal HEP. (15 MW)	15.75	G.O.I. No. 892/2001-ROC/934 dated 20.6.2001.

<b>8</b>	U.25 P. Ban-Deol	Binwa HEP-II (5 MW)	2.414	G.O.I. No. 9-1330/2001-ROC/2093 dated 25.4.2005.
<b>9</b>	U.25 P. Ban-Deol	Luni-II HEP (5 MW)	2.62	G.O.I. No. 9-HPB-632/2005-CHA/36 dated 22.12.2005.
<b>10</b>	U.12 P. Baghnal	Upper Awa (5 MW)	4.2	G.O.I. No. 9-HPB-574/2005-CHA/42 dated 21.12.2005.
<b>11</b>	U.33 B. Tatwani, U.29B. Reundhar & U.25B. Ban-deol	Luni-III HEP (5 MW)	4.63	G.O.I. No. 9-HPB-634/2005-CHA/39 dated 22.12.2005.
<b>12</b>	P.16 P. Supdhar	Baner-III HEP (5MW)	3.27	G.O.I. No. 9-HPB-569/2005-CHA/48 dated 22.12.2005.
<b>13</b>	U.11 P. Kandrachu - Nal.	Awa-II HEP (5MW)	2.99	G.O.I. No. 9-HPB-1333/2001-CHA/246 dated 20.01.2006.
<b>14</b>	U.25 B. Ban – Deol, BM Deol.	Luni HEP (5 MW)	4.06	G.O.I. No. 9-HPB-1293/2001-CHA/638 dated 10.02.2006.
<b>15</b>	U.39 P. Thalla	Neugal HEP-II (5MW)	3.32	G.O.I. No. 9-HPB-1318/2001-CHA/240 dated 20.01.2006.
<b>16</b>	U.29 B Reundar, U.26 B Tar, U.25 B. Ban-Deol.	Binwa HEP-II (5 MW)	2.12	G.O.I. No. 9-HPB-1209/2006-CHA/3430 dated 09.04.2007.
<b>17</b>	UP. 3 P. Diala.	Baner-II HEP (5MW)	3.58	G.O.I. No. 9-HPB-853/2007-CHA/4111 dated 30.07.2009.
<b>18</b>	U.25 B. Ban – Deol.	Uttrala – Baklod road.	3.01	G.O.I. No. 9-1105/2000-ROC/771 dated April, 2002.
<b>19</b>	U 43 B. Bhadraina & U.44 B. Ghorpith.	Upperi Bheth to Bhadraina.	1.62	G.O.I. No. 9-HPB-1083/2006-CHA/P 116 dated 20.09.2007.
<b>20</b>	UP. 125 B. Sansal & BM Sansal.	Sansal to Thathi via Matroon	0.57	G.O.I. No. 9-HPB-196/2007-CHA/10865 dated 21.11.2007.
<b>21</b>	P. 75 B. Chhamb.	Chobin Sansai road via Patel Nagar.	2.72	G.O.I. No. 9-HPB-1085/2006-CHA/10875 dated 20.11.2007.
<b>22</b>	U.4 P. Lanod, U.21 P. Kand & BM Lanod	Kandral-Tikkar-Maheshgarh road via Suhroo.	2.88	G.O.I. No. 9-HPB-926/2006-CHA/10872 dated 20.11.2007.

<b>23</b>	P.13 B. Baggidhar.	Improvement of PCM road NH 20 from 132/0 to 134/300 Km.	1.48	G.O.I. No. 9-HPB-205/2007-CHA/10798 dated 18.12.2008.
<b>24</b>	UPF 107 P. Nadli	Baru-Nadli-Gharchindi – Mali road.	1.56	G.O.I. No. 9-HPB-928/2006-CHA/2480 dated 24.03.2008.
<b>25</b>	UP 112 P. Naura.	Stone Crusher, M/S ORBIT Mineral Udhog Association.	0.49	G.O.I. No. 9-HPB-2473/2004-CHA/1060 dated 10.04.2006.
<b>26</b>	P.76 B. Tain, UP. 42B.Sansai.	Water Supply Scheme Sansai to Kithi Majhoti.	0.03	G.O.I. No. 9-HPB-227/2007-CHA/2561 dated 24.03.2008.
<b>27</b>	CFS Paraur.	Water Supply Scheme Paraur.	0.39	G.O.I. No. 9-HPB-874/2006-CHA/P 52 dated 28.10.2007.
<b>28</b>	CFS Patti.	Ayurvedic Dispensary Patti.	0.02	G.O.I. No. 9-HPB-431/2007-CHA/2311 dated 20.03.2008.
<b>29</b>	UP 49 J. Alampur.	33 KV Sub-Station at Lahroo-Dadu (Bheri)	0.20	G.O.I. No. 9-HPB-029/2008-CHA/4448 dated 05.08.2009.
<b>30</b>	BM Bundla.	Solid Waste Management Plant M C Palampur.	0.50	G.O.I. No. 9-HPB-581/2009-CHA/3695 dated 14.09.2010.
<b>31</b>	HP Govt Forest Land (Ban Bhartari)	33 KV Sub-Station Gopalpur at Nagri.	0.45	G.O.I. No. 9-HPB-049/2009-CHA/539 dated 20.01.2010.
<b>Total</b>			<b>81.2065</b>	

Source: Forest Division Palampur.

So far, a total of 81.2065 ha of land in thirty one cases have been diverted for non-forestry purpose in this Division under this Act. While carrying out such activities with the prior approval of Government of India, compensatory afforestation equal to the area diverted on non forest land and double the area diverted on the forest land has been stipulated.

**1.1.13. RIGHTS AND CONCESSIONS:** - The rights and concessions in the Demarcated Protected Forests were settled during Anderson's Settlement and are recorded in "Detailed Tika-war record of Rights". These consist mainly of grazing, timber, collection of firewood, grass cutting, extraction of torchwood, lopping of oak / maral trees for fodder, right of way, water etc. The rights and concessions in the newly formed D.P.F.s during 1993 settlement are given in the respective Revenue Files available in D.F.O. office.

**1.1.13.1. RIGHTS IN UNCLASSIFIED FORESTS:** - Rights in the Un-classified Forests are almost similar to All the rights of users (except those of Gaddies and Gujjars) are appended to the cultivated land assessed to “land revenue” and are acquired and alienated with such land and are exercised only for the bonafide agricultural and domestic requirements. These are further subject to the condition that the right holders shall be responsible for the pay of the “Rakhas” and that the rights will not be exercised to such an extent that will endanger the very existence of the forests. Government retains the power to curtail or suspend their rights for sufficient reasons.

The exercise of rights is regulated by the rules framed under Section 32 of the Indian Forest Act, vide Notification No. 416 dated 14<sup>th</sup> august 1897, amended by No.55 dated 6<sup>th</sup> February 1904 and No. 995 dated 11<sup>th</sup> January 1919 for Kangra proper and in Notification No. 59 dated 6<sup>th</sup> February 1904 as amended by No.22677 dated 28<sup>th</sup> October 1919.

**1.1.14. SUMMARY OF PRINCIPAL RIGHTS:** - The principal rights recognized at the Forest Settlements are; breaking up of land for cultivation, timber for building purpose, wood for burning the dead bodies, wood for agricultural implements; grazing, grass cutting and lopping, wood for marriage ceremonies, collection of medicinal herbs, flowers and fruits etc. The sale proceeds of grass from the areas closed by the Government and fruits of trees belong to the village proprietors. Government is entitled to protect, improve and reproduce the forest growth and to sell trees to the traders and non-right holders, only after meeting the requirements of the right holders.

**1.1.14.1. BREAKING UP OF LAND FOR CULTIVATION:** - Large-scale lands have been granted to landless people in the past, before the enactment of The Forest (Conservation) Act, 1980. The forests of various kinds are yet to be de-notified although “nautors” in such forests had been granted by the Revenue Department. However, with the enactment of “The Forest (Conservation) Act 1980” no forestland now can be diverted for any non-forestry purpose without the prior permission of the Government of India. Thus, the power of the Deputy Commissioner has been curtailed under the provision of this Act. However, encroachments are prevalent throughout the Division. For agricultural and other non-forestry purposes large-scale forestlands have illegally been encroached upon. This has caused set back to the forestry works.

**1.1.14.2. TIMBER FOR BUILDING PURPOSE:** - People largely depend on timber for construction of houses. Timber for bonafide requirements can be granted to the right-holders at concessional rates. These rates are as under in Table 1.1.8.



**Table 1.1.8. Rates of timber granted to right holders**

<b>Sr. No.</b>	<b>All Species.</b>	<b>Rate per tree.</b>
1	Right Holders above poverty line.	30%of the rates at which timber is sold by Himachal Pradesh Development Forest Corporation Ltd. Commercially.
2	Right Holders below poverty line.	10%of the rates at which timber is sold by Himachal Pradesh Development Forest Corporation Ltd. Commercially
3	Right Holders suffering from natural calamities.	Free of cost.

**1.1.14.2.1.** The trees principally used in building purposes, in the low hills are *Pinus roxburghii*, *Dalbergia sissoo*, *Acacia catechu*, *Albizia stipulata*, *Albizia lebbek*, *Shorea robusta*, *Syzygium* species; and those used in high hills are *Pinus wallichiana*, *Quercus leucotrichophora*, *Q. semicarpifolia* etc. The grant of trees at Zamindari/concessional rates (T.D. grant) to a right holder is regulated as per the provisions in the Forest Settlement. The species wise details of standing trees given to the right holders in the tract are appended in **Appendix-XII**.

**1.1.14.2.2.** A number of instructions / notifications were issued in the past regulating grant of T.D. to right holders. However, HP Government vide notification No. FFE-B-E (3)-43/2006-Vol-I dated 2nd January, 2010 has framed "Himachal Pradesh Forest (Timber Distribution to the Right Holders) Rules, 2009. According to these rules T.D. shall be granted to the Right Holders who have their recorded rights in the concerned Forest Settlement Reports for the grant of Timber Distribution for construction/maintenance of residential house, cow sheds etc. for bonafide domestic use. These rules also envisages that no T D shall be granted in urban areas, if trees to meet the requirement of timber for construction of residential house, cow shed etc. are available on the land holdings of the Right Holder concerned and no timber shall be granted for ten years if the Right Holder has sold trees yielding timber for construction of houses from his private land holding. Further, in case any right holder has land holding at more than one place, he shall have option of getting T D at one place only. For this purpose a Right holder shall submit an affidavit clarifying therein his rights of Timber Distribution at different places and his place of option for getting Timber distribution. Option once exercised shall not be allowed to be changed. These rules further provides that with effect from this notification, no Timber Distribution shall be granted to a land owner who has purchased land after obtaining the permission of the Government under section 118 of the Tenancy and Land Reforms Act, 1972, irrespective of the date of purchase of such land. The Timber distribution shall be granted only to the head of the family as per revenue records. Timber Distribution shall not be granted for the construction/maintenance of buildings to be used for commercial and hiring purposes. These rules further envisage that the Timber

Distribution shall not be granted to the Right Holders, if trees for the purpose are not available silviculturally in the forest where concerned right holders have Timber Distribution right. Timber Distribution rights shall be subject to cooperation and participation of Right Holders in forest conservancy. In case any Right Holder fails to perform his duties for apprehending offenders, extinguishing fire or commits any forest offence as contained in the Forest settlement Report, his right of Timber Distribution shall be suspended up to ten years; and Timber Distribution right of a Right holder shall be suspended up to ten years if he is found to have mis-utilised the Timber Distribution grant or committed any forest Offence until he is eligible again for Timber Distribution. According to these rules the periodicity for grant of Timber Distribution to the Right Holders shall be once in life time or thirty years for new construction and once in fifteen years for additions/alterations. The Timber Distribution shall be granted in converted form from the depot and quantity for new construction is three cubic meter and for maintenance one cubic meter. The right holders shall apply for grant of Timber Distribution through concerned Panchayat to the concerned Fgd. by 31<sup>st</sup> March of each year. The application shall be processed and Timber Distribution shall be given to the eligible right holders between September to December of the year.

**1.1.14.3. WOOD FOR BURNING THE DEAD, FUNERAL RITES, MARRIAGE CEREMONIES, AND AGRICULTURAL IMPLEMENTS ETC:** - For the regulation of grant of wood for these purposes trees have been divided in to two classes; the first class comprising the 62 “reserved species” given in para 1.1.8.5 and the second class containing all other species. The trees of second class be granted by the Range Officer (previously this power was vested with the Lambardar) so long as these are not used for building purposes of any kind what so ever; and where second class trees are not available, crooked or unsound trees of first class, with the exception of 19 species can be granted. These species are Cedrus deodara, Abies webbiana, Picea morinda, Juglans regia, Buxus sempervirens, Ulmus wallichiana, Cedrella toona, and C. serrata, Dalbergia sissoo, Shorea robusta, Acacia arabica, and Celtis australis. Aesculus indica, Acer species, Olea cuspidate, Pistacia integerrima, Terminalia chebula, T. belerica and Bassia latifolia. Provided that the reserved trees cannot be felled until these are first marked by a duly authorized forest official. Species wise details of trees given to the right holders is appended as **Appendix-XIV**. However, for actual burning of dead, a sufficient quantity of wood, except of the above mentioned 19 species, may be cut without being first marked provided that the notice is given to local forest official within ten days.

**1.1.15. GRAZING:** - In the Demarcated Protected Forests, only the persons having recorded rights may graze their cattle, other than sheep and goats. In Undemarcated Protected Forests, proprietors as well as the tenants of agricultural land may graze their cattle. In both the cases, the right holders may graze only their own cattle. However, there is no limit to the number of the cattle to be grazed. The only important exception that the owners of the soil of “Savannas” may allow others to graze and may take from the occupants such dues as are recorded in the

Land Revenue Settlement Records. As to sheep and goat grazing, the right holder may graze any number of such animals as are required for his domestic and agricultural (excluding pastoral) purposes, or a number of equal to 30% more than the number recorded at O'Brien's assessment of land revenue in 1892, whichever is greater. With the exception mentioned above, the resident non-right holders may graze their own domestic cattle free if the right holders do not object.

**1.1.15.1 GADDI GRAZING:** - The "gaddis" who generally belong to Chamba but, in some cases, have settled in Kangra to become entitled to all the rights of user, are true shepherds. The rich pastures on southern slopes of Dhauladhar provide autumn and summer grazing, but during winters the flocks move down to the lower hills in their recorded "runs" which provide only insufficient and poor grazing. In rainy season, they take shelter across the main range in Bara Banghal, Chamba and Lahaul, where grazing of very fine quality is available in alpine pastures. Govt. of H.P. on the recommendation of Grazing Advisory Committee has vide their memo. No. 6-2769-SF-II dated 29.4.1975 fixed the following rates to be charged per animal from the graziers throughout the State

- (i) Sheep: Raised from 19 paise to 20 paise.
- (ii) Goat: Raised from 37 paise to 50 paise.
- (iii) Buffalo: Rs. 8/-

In accordance with the recommendation No. 32 (1) of the Grazing Advisory Committee, Conservator of Forests, Dharamshala vide his Standing Order No. 1 dated 29.12.1987, has frozen the number of sheep and goats allowed grazing at the level of that actually grazed in year 1970-71. It has further been advised that in case a grazier voluntarily wants to substitute a goat with sheep, one and half sheep be allowed for every goat. The grazing dues which were being charged separately in summer and winter grazing runs are ordered to charged only once a year at the following rates:

- (i) Sheep: 20 paise each.
- (ii) Goat: 50 paise each

**1.1.15.2.** The grazing of the flocks is governed by the following rules:

- (i) The graziers are charged grazing dues **(trini)** @ 20 paise per sheep and 50 paise per goat once a year. The permissible number is limited to that of the year 1970-71. All excess goats are charged rate of Rs. 5/- per head and sheep Rs.3/- per head from the graziers.
- (ii) For purpose of enumeration, lambs and kids born in the spring are counted.
- (iii) Daily stages must be at least 8 kms. apart.
- (iv) No halt may ordinarily be made for more than one night at any halting place, but when delayed by rain or by necessity of giving salt to the flocks, a halt for two nights is allowed. If these limits are exceeded, a halting fee equal to the full grazing fee is leviable but the Deputy Commissioner, at his discretion in special cases, may reduce it in case of goats to not less than Rs. 4.69 per hundred.

A halting fee of Rs. 4.69 per hundred should be charged for halting more than two days, but less than six days unless the halt is for manuring the fields of right holders, when no fee is leviable; Rs. 6.25 per hundred for goats and Rs. 4.69 per hundred for sheep if the stay exceeds 9 days, but does not exceeds 15 days (excluding the days allowed for manuring). No flocks are permitted to halt at a place for more than 15 days. The period of halt for manuring should not exceed 3 nights at one place and halting fee is leviable for excess halts even if the halt is for manuring purposes.

- (v) In spring, a halt of three weeks in the higher ranges in excess of the period actually necessary for the journey across the passes is permitted.
- (vi) No halting fee is to be charged for halting in Tikas where the Gaddis own land and are, thus, right holders provided they confine their grazing to the forests in which they have rights as owner of land.
- (vii) Gaddis and Zamindars must make their own arrangements with regard to manuring field, but the Zamindars may not interfere with the Gaddis even if they refuse to manure.

**1.1.15.3. MAINTENANCE OF RECORD OF GADDI GRAZIERS:** - As recommended by the Grazing Advisory Committee in recommendation No. 32 (1) to bring uniformity in maintaining the record viz. registration and enumeration of the flocks, Conservator of Forests Dharamshala vide his Standing Order No. 1 dated 29.12.1987 prescribed the following procedure:

- (i) The grazing permits will be from 1st July to 30<sup>th</sup> June each year.
- (ii) The fixation of routes and halting stages will be as per Record of Rights and where such routes and halting stages have submerged as in part of Nurgpur and Dehra Divisions on construction of Pong Dam, alternate places be provided.
- (iii) The Incharge of the Beat on the counting slip issued by the Range Officer in favour of the concerned grazier immediately after the later enters the grazing run will do the counting of sheep and goats.
- (iv) The Forest Guard In charge Beat will submit the counting slip to the Range Officer, who will realize the "trini", if not already paid. In case the graziers has paid the trini the Range Officer will issue the "dummy permit" and make similar entry in his Cash Book. While issuing the permit, the Range Officer must ensure to incorporate the permitted number of sheep and goats at the frozen level.
- (v) The permit will lapse if the grazier dies without any legal heir. The permit will not be transferable to any body except to the legal heir.
- (vi) The grazing permit should not be renewed after lapse of three years by the D.F.O. and the cases of renewal beyond this permit be referred to the Circle Office and no request for period exceeding ten years be entertained.

**1.1.15.4. GUJJAR GRAZING: (BUFFALO GRAZING):** - Gujjars are of two classes; **(i)** Ban-Gujjars and **(ii)** Sawanadars. The former were originally nomads, the latter are invariably permanent residents of the district and generally co-proprietors of the villages and have sawnas or Dhars recorded in their names, which can be transferred only through inheritance. The Sawanadar Gujjars may graze their cattle in the sawanas recorded in their names to the exclusion of cattle of all other right holders during the three four months of monsoon. The Ban-Gujjars, on the other hand, have got no recorded rights in this Division.

**1.1.16. LOPPING:** - The lopping of thirteen species is entirely prohibited. All other trees may be lopped for fodder, bedding and manuring by the right holders, by sawanadar Gujjars within their sawanas, by Ban-Gujjars wherever permitted to graze and by Gaddies within their grazing runs (for kids only) provided no tree less than 45 cm. in girth can be lopped for more than one half of their height. The enforcement of these rules has, however, been very difficult especially near settlements of Gaddies and Gujjars. Thirteen species prohibited for lopping are as under in Table 1.1.9.

**Table: 1.1.9 Showing prohibited species for lopping**

Sr. No.	Species.	Sr. No.	Species.
1	Cedrus deodara	8	Dalbergia sissoo
2	Abies webbiana	9	Shorea robusta
3	Picea morinda	10	Acacia arabica
4	Juglans regia	11	Olea cuspidata
5	Buxus sempervirens	12	Rhododendron arboreum
6	Cedrella toona	13	Pistacia integerrima
7	Cedrella serrata		

Source: Old Working Plan.

**1.1.17. GRASS CUTTING:** Grass cutting is allowed except in the regeneration and plantation areas, where it is permitted at the discretion of the Divisional Forest Officer.

**1.1.18. ZAMINDARI-SHARE (HAQ-CHUHARAM):** - From early times (1859) a part of the revenue obtained from the sale of the trees is paid to the village communities, to be divided between the village proprietors and certain specified village servants. To quote paragraph 61 of Anderson's Forest Settlement Report for Kangra District "this was not a Malkana paid in recognition of their propriety in soil, but was a voluntary grant to secure their interest and cooperation in forest conservancy. If the village does not render assistance in enforcing forest rules, this grant can and should be taken away as punishment". The Deputy Commissioner can disallow share up to one year but for longer period commissioner's sanction is needed.

In the protected and un-classed forests of the Division, one half of the sale proceeds of trees sold at Zamindari rates and one quarter of the net revenue (calculated by deducting all working charges except the cost of establishment from

the gross revenue and departmental works) are paid to village proprietors, Lambardars and Rakhas in the ratio of 50%, 18.75% and 18.75% respectively. The remaining 12.505 earlier being Patwari's share has been resumed Government. The share of the proprietors and Lambardars is paid to the Deputy Commissioner in part payment of land revenue demand. The Rakhas receive their share direct from the Forest Department.

In the delimited protected forests the total share is divided amongst the constituent Tikas in the proportion given in the Compartment History Files, but in the Un-delimited Protected Forests, the whole share goes to the Tika from which the trees are sold.

From 1961-62 the Punjab Government allowed the share of the village proprietors to be paid to the respective Gram Panchayats. For Bara Banghal area, Punjab Government vide memo. No. 393-Ft. dated 3.2.1962 resumed the Zamindari share of Khewatdars and Lambardars and ordered it to be paid to the Panchayat on fulfillment of certain conditions. The share of Rakhas was to be credited to treasury as provisional revenue and interest at rate of 3% per annum was allowed to be paid.

H.P. Government vides their letter No. II-21/74 (Rev.-B) dated the 1st December, 1976 have stopped the payment of Z-share to the Khewatdars beyond 1973-74. The contentions being that the lands, earlier being the property of the Khewatdars have now vested in the Government. In this connection, the aforementioned note by Anderson that this was not a Malkana in recognition of their right in the land but a voluntary grant to secure their interest and cooperation in forest conservancy is relevant. Thus, the withholding of Z-share has incorrectly been linked with the vesting of land in the Government. Moreover, the payment of a share of revenue from the Unclassed Forests in 21 villages of Nurpur and 29 villages of Dehra Tehsils, where Reserved Forests were created, is a distinct right and not a concession (Z-share) as in other areas. The withholding of payment of Khewatdars and Lambardars in these villages is an infringement of settlement rights.

**1.1.19.SPECIAL RIGHTS:** - Some special concessions were conferred in favour of the Jagirdar of Bir at the time of settlement. These concessions are, however, mainly concerned with timber rights and do not materially affect the forest management.

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## CHAPTER-II

### CHAPTER-IIA (FOREST FLORA)

**1.2.1. GENERAL:** - The tract has apicturesque beauty of its snow clad Dhauladhar ranges, mountain peaks and greenery. The forests of this division are scattered over a large tract vastly varying in various locality factors. The vegetation therefore varies from dry scrub forests at the lower altitude to alpine-pastures at higher elevations. In between these two extremities, occur distinct vegetation zones of **Chil, Ban oak**, mixed conifers (mainly **Kail, Fir** and **Spruce**) and **Kharsu oak** forests. The present condition of these forests is as a result of extremely heavy burden of numerous loosely defined rights of user groups and very heavy incidence of grazing, especially in the Un-delimited and Un-classed forests.

**1.2.2. COMPOSITION AND CONDITION OF CROP:** - The naturally occurring forests of this division are of large number of forest types ranging from Dry Tropical Forests to Moist alpine Scrub. The forests in Palampur Forest Division stretch from the banks of Beas to the tops and slopes of lofty ranges of Dhauladhar, which separate the Bharmour Forest Division. These present a large variety of different features and a great diversity of climate and vegetation. The altitude difference of 590 meters near Alampur to 5200 meters on the main ridge coupled with aspect and biotic influence results in a diversified and rich forest flora starting with riverbank species like **Shisham, Khair, Kamal** and ending with **Spruce, Fir** and **temperate pastures**. The riparian species are replaced by Dry Mixed Deciduous Forests above the banks of river, streams and continue up to elevation of 1000 meters where after the ground is taken over by **Chil** which extends up to about 1900 meters beyond which there are stretches of **Ban, Kail** and very few **Deodar** providing ground to **Spruce, Fir** and **Kharsu** with the rise in altitude and change in aspect. **Oaks** and **Brass** are found both as under-storey (in **Kail, Spruce** and **Fir** forests) and as pure crops in temperate zone. **Walnut, Horse Chestnut, Maple** and **Bird cherry** etc. are found scattered in temperate zone and in glades in the depression. Broadly, the forests of this division may be grouped into the following types and sub-types as per "A revised survey of the forest types of India 1962" by **Sir Herry G. Champion and S.K. Seth** as under: -

#### GROUP 5: DRY TROPICAL FORESTS:

- (i) 5/BC1a- Dry Siwalik Sal forests.
- (ii) 5/BC2-Northern Dry Mixed Deciduous forests.
- (iii) 5/B/D.S.1-Dry Deciduous Scrub.

#### GROUP 9: SUB-TROPICAL PINE FORESTS:

- (iv) 9/C1a- Lower or Siwalik Chil Pine forests.
- (v) 9/C1b- Upper or Himalayan Chil Pine forests.

**GROUP 10: SUB-TROPICAL DRY EVERGREEN FORESTS:**

**GROUP 12: HIMALAYAN MOIST TEMPERATE FORESTS:**

**SUB-GROUP:** 12/C1: Lower western Himalayan Temperate Forests.

(vi) 12/C1a- Ban Oak Forests. (*Quercus leucotrichophora*)

(vii) 12/C1d-Western Mixed Coniferous Forests. (Spruce, Fir, Kail)

**SUB-GROUP:** 12/C2: Upper West Himalayan Temperate Forests.

(viii) 12/C2a-Kharsu Oak Forests. (*Quercus semicarpifolia*)

(ix) 12/D.S.2-Himalayan Temperate Parkland.

(x) 12/D.S.3-Himalayan Temperate Pastures.

(xi) 12/1S1-Alder Forests.

(xii) 12/2S.1-Low Level Blue Pine Forests.

**GROUP 14: SUB-ALPINE PASTURES.**

(xiii) 14/2S.1-Sub-alpine Blue Pine Forests.

(xiv) 14/D.S.1-Sub-Alpine Pastures.

**GROUP 15: MOIST ALPINE SCRUB.**

(xv) 15/C1-Birch/Rhododendron Scrub.

(xvi) 12/C2-Deciduous alpine Scrub.

(xvii) 15/C3-Alpine Pastures.

The above types and sub-types can be reduced, keeping in view their management, and main groups, forests, sub-types are described and discussed according to “A revised survey of the forest types of India 1962” by **Sir Harry G. Champion** and **S.K. Seth** as under: -

**1.2.2.1. GROUP 5: NORTHERN TROPICAL DRY DECIDUOUS FORESTS: -**

This group occurs mainly on shallow, sandy, well drained soil derived from siwalik sand Rock and conglomerates. The annual rainfall varies from 750 mm. to 1500 mm. though typical rainfall is between 1000 mm. to 1300 mm. The number of rainy days varies from 40 to 81 and number of months with rainfall less than 50



mm. from 5 to 8. The mean annual temperature ranges between 23.5 degree Celsius and 29 degree Celsius. The mean January temperature varies from 16.4 degree Celsius to 25.4 degree Celsius.

**1.2.2.2. Type 5B/C1a: Dry Siwalik Sal Forests:** - This sub-type occurs on shallow, sandy, well drained soil derived mainly from siwalik sand rock and conglomerates. Average rainfall is about 1500 mm. The Sal is generally of low quality and of poor growth and form. Regeneration of Sal is deficient and slow and difficult to obtain. There is only one forest, **P.21 P. Andretta** of this type in this division. This is peculiar instance where Sal (***Shorea robusta***), Ban Oak (***Quercus leucotrichophora***) and Chil (***Pinus roxburghii***) are found mixed together. The other associates are: ***Albizzia*** species, ***Syzygium cuminii***, ***Machilus*** species, ***Ficus*** species, ***Bauhinia*** species and ***Terminalia*** species. The undergrowth of ***Berberis*** species, ***Xylosma*** species, ***Murraya koenigii***, ***Rosa moschata*** is quite common. ***Bauhinia vahlii*** is common climber present in this forest. This type is however, of little practical significance to this division.

**1.2.2.3. Type 5B/C2 & 5B/D.S.1: Northern Dry mixed Deciduous and Dry Deciduous Forests:** - These forests are found mainly between elevations 600 meters to 1200 meters i.e. lower areas of this division, with annual rainfall varying from 600 mm. to 900 mm. These forests occur mainly in Droh range and partly in Panaper Block of Palampur Range. The rock formation is mainly conglomerates. Towards the upper limit where the rock is generally sand stone, the scrub is replaced by chil. These forests are composed in varying proportion of mainly trees/shrubs of ***Acacia catechu***, ***A. modesta***, ***Bauhinia variegata***, ***Albizzia lebbek***, ***Bombax ceiba***, ***Pistacia integerrima***, ***Lannea coromandelica***, ***Aegle marmelos***, ***Ficus religiosa***, ***F. benghalensis***, and ***Kydia calycina*** etc. The undergrowth consists of ***Carissa opaca***, ***C. spinarum***, ***Dodonaea viscosa***, ***Woodfordia fruticosa***, ***Murraya koenigii***, ***Adhatoda vesica*** etc. The forests are generally open, degraded and getting eroded due to over grazing and excessive exercise of other rights. The productivity of these forests is at present very low. Most of the species in these forests are of poor utilization and economic value.

Regeneration, in areas not closed to grazing is practically absent. Plantations mainly of Chil and partly of broad-leaved species have been raised during plan period by obtaining voluntary closures. The lower areas, being very dry and having shallow soil are difficult to regenerate.

**1.2.2.4. GROUP 9: SUB-TROPICAL PINE FORESTS:** - This group occurs between altitudes of 800 meters to 1800 meters. The main species is ***Pinus roxburghii***, which occurs in pure forests in this tract. The best growth of Chil in this tract is found between 1200 meters to 1700 meters elevation, on loose, sandy loam soils derived from hard sand stones. Towards its lower limits, Chil is confined to the cool, northern aspect but at elevation of 1200 meters and above it occurs all over. The mean annual rainfall varies from 900mm. to 2600mm. The number of rainy days varies from 67 to 122 and number of months with rainfall less than

50mm. from 2 to 7. The mean annual temperature ranges between 15 degree Celsius to 20 degree Celsius and mean January temperature varies from 8 degree Celsius to 10 degree Celsius. The site quality of Chil is mainly III, the form and growth of crop is generally inferior.

**1.2.2.5. Type 9/C1a: Lower Siwalik Chil Pine Forests:** - This sub-type occurs on steep dry slopes below 1000 meters elevation mainly on siwalik conglomerates and sand stones. This sub-type is mainly confined to Droh Range and Panaper Block of Palampur Range such as **P.27 P. Khatin, P.31 P. Sakrotu, P.36 P. Bajur gahar P.40 J. Duhak**, and **U.P.51 J. Dhaniara**, etc. The common associates of Chil in this sub-type are **Terminalia chebula, T. belerica, Mallotus philippinensis, Pyrus pashia, Syzygium cuminii, Phyllanthus emblica, Albizzia** species etc. The under growth of **Carissa opaca, C. spinarum, Dodonaea viscosa, Flacourtia** species, **Rubus** species, **Murraya koenigii** is moderately thick with grass growth of **Heteropogon contortus, Cymbopogon martini, Chrysopogon Montana** and **Themeda anthera** etc. Fire and grazing are the main factors inhibiting natural regeneration.

**1.2.2.6. Type 9/C1b: Upper or Himalayan Chil Pine Forests:** - This sub-type occurs mainly between 1200 meters to 1800 meters and is found mainly in Palampur and Baijnath ranges. The majority of Chil forests of this division belong to this sub-type. This sub-type is characterized by more or less pure crop of Chil with a light mixture of **Quercus leucotrichophora, Rhododendron arboreum, Pyruspashia, and Lyonia ovalifolia** etc. towards upper limits and **Albizzia** species, **Syzygiumcuminii, Ficus** Species, **Terminalia chebula, T. belerica** and **Bauhinia** species towards lower limits. The Under growth of **Lantana camara, Pogostemon plactranthoides, Myrsine africana, Berberis** species, **Rubus** species, **Murraya koenigii, Woodfordiafruticosa** and **Carissa** species is generally scanty. Natural regeneration is normally profuse and get easily established e.g. in **P.20 P. Paror**, if protection against grazing and fire is ensured. At the upper extremities, occasional fires are, however not harmful for Chil as these helps in elimination of other moisture loving broad-leaved species. Typical example of this sub-type of forest in this tract is **P.12 B.Panjala, P. 13 B. Baggidhar, P.19 P. Lahla, U.4 B. Lanod, U.5 B. Deol, U.8 P. Kandi, C.F.S.Paror, C.F.S. Bhagotla** and **C.F.S. Khalet** etc.

**1.2.2.7. 9GROUP 12: HIMALAYAN MOIST TEMPERATE FORESTS:** - This group occurs in this tract with altitude between 1500 meters to 3300 meters, the limits varying with aspect and configuration. The annual rainfall varies from 1100mm. to 2700mm. The mean annual temperature ranges between 13 degree Celsius to 16 degree Celsius and the mean January temperature varies from 1 degree Celsius to 6 degree Celsius.

**1.2.2.8. Type 12/C1a: Ban Oak Forests:** - Most of these forests in this tract are found in the elevation range of 1600 meters to 2300 meters along the main slopes of main range. However in cases such as **P.21 P. Andretta** and

**C.F.S.Ghadoral**, these are found at much lower elevation. This forest occurs on fairly deep, fertile, loam soils derived from gneiss and schist on the slopes of Dhauladhar. There are, however, two marked exceptions **P.21 P. Andretta** and **C.F.S. Ghadoral**, where compact patches of Ban oak are met with at much lower elevations of 950 meters 1100 meters respectively. This is ascribed to the transportation of rocks of Himalayan series from the main ridge by glacial action. The annual rainfall is heavy, 1800mm. to 2700mm. This type is mainly distributed in Palampur and Baijnath ranges of this division.

The Ban oak crop is generally pure, open canopied and of short bole. Occasional instances of stands of well developed, tall trees forming close canopy are also met with in some compartments of **P.14 P. Kandbari** forest. The average top height of ban trees in these forests is 21 meters to 22 meters. On the cooler, favourable sites there is an appreciable mixture of **Rhododendron arboreum**, **Pieris ovalifolia**, **Pyruspashia**, **Litsea umbrosa** and **Cedrella serrata** etc. Chil is found mixed with Ban oak on the exposed, dry and warmer aspects towards lower limits of this type. Undergrowth of **Berberis aristata**, **Indigofera** species, **Sarcococca saligna**, **Daphne cannabina**, **Arundinaria falcata**, **Rubus** species and **ferns** is moderate to dense depending upon the incidence of grazing.

Ban oak forests, specially those situated near habitations are much exposed to damage by heavy lopping for fodder and hacking for fuel. Natural regeneration, on the whole is satisfactory in areas closed to grazing such as **P.21.P.Andretta**, **P.14.P.Kandbari** and Compartment **S-3 of C.F.S. Ghadoral**, elsewhere it is deficient mainly because of heavy incidence of grazing, fire and maltreatment by local inhabitants. In some degraded ban oak forests on the warmer aspects and towards ridge it is being replaced by Chil.

**1.2.2.9. Type 12/C1d: Western Mixed Coniferous Forests:** - This type of forest occurs at an elevation of 2100 meters to 3000 meters partially in **P.11 B. Sansal**. The proportion of Fir (**Abies pindrow**) increases on cool, sheltered valleys and in the higher elevations. Towards the upper most extremities, Kharsu Oak (**Quercus semicarpifolia**) is found intimately mixed with Fir and Spruce. At the lower altitudes, generally along the nallahs and depression, common associates are **Aesculusindica**, **Juglans regia**, **Acer** species, **Ulmus wallichiana**, **Morus serrata** and **Prunus** species etc. The tree canopy is frequently broken by extensive grassy glades and meadows formed due to the cumulative effect of use of these areas as grazing and camping grounds by the flocks. The average site quality of pure Kail in Bara Bhangal is III. The trees of Fir / Spruce attain a height of 40-45 meters and a large girth. On the whole there is preponderance of middle aged and mature trees, young trees being markedly deficient. The undergrowth mostly consists of **Viburnum nervosum**, **V.cotinifolium**, **Strobilanthus** species, **Deutzia corymbosa**, **Rubus niveus**, **Fragaria** species, **Viola** species, **Valerina** species, **Skimmia laureola**, **Arundinaria falcata** etc. Density of undergrowth depends mainly on the intensity of grazing. The climbers viz. **Hedera helix**, **Vitis semicordata**, **Schizandra grandiflora** and **Clematis** species are quite common.

Natural regeneration is deficient and is a problem. Over grazing and forest fires are two main inhibiting factors. Large blanks have been caused in these forests due to fire and avalanches. Grazing has proved disastrous to the establishment of such regeneration and has rendered fresh regeneration almost impossible.

**1.2..2.10. Type 12/C2a: Kharsu Oak Forests:** - The Kharsu Oak (**Quercus semicarpifolia**) forests are found between the altitudinal zone of 2300 meters to 3300 meters particularly on southern aspects and scarp slopes. This **Oak** occurs generally as a pure crop but is frequently mixed with **Spruce** and **Fir**, invariably found scattered individually or in small patches on sites favourable to these species. **Rhododendron arboreum**, **R. companulatum** **Cotoneaster microphylla**, **Acer** species, **Ilex dipyrena** etc. forms the under wood. The undergrowth is generally dense and mostly consists of **Arundinaria falcata**, **Cotoneaster species**, **Strobilanthus species**, **Viburnum foetens** and **Indigofera** species etc. These forests are usually broken by numerous blanks caused either by avalanches or by constant use as camping grounds by migratory flocks. The Kharsu Oak occupies almost a continuous belt all along the Dhauladhar ranges in the main valley. There is however, marked absence of this species towards the western boundary of the division, from **P.16 P. Supdhar** forest up to Narwana in Dharamsala forest division. Complete absence of Kharsu Oak in this area is difficult to explain and can not be attributed to any specific cause, as soil and the climatic conditions of this locality do not seem to be different from the conditions in other similar forests. Regeneration of kharsu oak is deficient owing to heavy grazing pressure in these forests by migratory flocks.

**1.2.2.11. Type 12/DS 2 & DS 3: Himalayan Temperate Pastures and Parklands:** - The temperate pastures are sporadic, smaller in size, distributed along the main ridge of Dhauladhar in Palampur and Baijnath Ranges. Where grazing has taken place in the temperate forests by migratory graziers, favourable sites on ridges and the greater slopes especially where moist or near water, have gradually been cleared passing through the parkland stage to open grassland. The grasses commonly found in such pastures are **Festuca** species, **Arostus** species, **Calmagrotis** species, **Dactylis glomerata**, **Bromus** species, **Danthonia** species and many others. Lower down in the Deodar and ban oak patches, these grasses are mixed with tropical species, viz. **Themeda**, **Heteropogon** and **Chrysopogon** etc. The pastures lying longer under snow differ in floristics. These meadows are mostly composed of perennial mesophytic herbs with little grasses. Conspicuous among the flowering herbs are **Potentilla argrophylla**, **Rosa serica**, **Primula**, **Anemone**, **Fritilaria**, **Iris**, **Gentiana** with many Ranunculaceae, Cruciferae, Compositae and Caryophyllaceae species.

**1.2..2.12. Type 12/1S1: Alder Forests:** - This type of forests occurs in patches along the banks of nallahs and on landslips in Baijnath and Palampur Ranges. These patches are limited to sites with permanent water supply. The altitudinal range is a wide one extending from 1000 meters to 3000 meters. Mycorrhiza is known to occur on the roots. An under wood may or may not be present, its amount and composition depending upon site conditions. Other associates in the top canopy are **Ulmus villosa**, **Celtis australis** and **Populus ciliata** etc. Under growth consists of **Sarcococca saligna**, **Spiraea** species, **Berberis** species, **Prinsepia utilis** and **Plectranthus rugosus** etc. Ground flora comprises of **Rumex nepalensis**, **R. hestatus**, **Urtica dioica**, **Gerardinia heterophylla** and **Ranunculus** species.

**1.2.2.13. GROUP 14 & 15: MOIST ALPINE SCRUB AND ALPINE PASTURES:** - This type of forest extends throughout the division above the elevation of 3500 meters. In these scrubs vegetation consists mainly of **Rhododendron**, **Birch** and some other deciduous trees. Owing to the weight of snow, trees are all bent at the back. The stems are short and branchy.

**1.2..2.14. Type 15/C1: Birch, Rhododendron Scrub Forests:** - This type of forests extends throughout the division above the elevation of 3500 meters. Vegetation mainly consists of **Rhododendron companulatum**, **Betula utilis**, **B. alnoides** and **Pyrus aucuparia** etc. These forests are usually broken by numerous blanks caused by avalanches. Owing to heavy snowfall, the trees are generally bent at the base. The stems are short, branchy and rarely attain a girth more than 60 cm.

**1.2.2.15. Type 15/C3: Alpine Pastures:** - In this Division alpine pastures extends throughout above the elevation of 3800 meters. This is represented by extensive alpine meadows with a few scattered patches of evergreen branchy scrubs of **Juniperus recurva** and **Rhododendron companulatum** of hardly 1-2 meters height. The meadows comprise of perennial mesophytic herbs and grasses. The main herbs are **Primula**, **Anemone**, **Iris**, **Gentiana**, **Fritillaria**, **Mecnopsis**, and **Aconitum** etc. The main grasses are **Agropyron longlaristatum**, **A. semecostatum**, **Branchypodium sylvaticum**, **B.Japonicus**, **Dactylus** species, **Danthonia** species etc. From spring to autumn, the alpine pastures offer excellent grazing ground and are over run by numerous migratory flocks of sheep and goats. These are also rich treasure of a number of valuable medicinal / aromatic herbs that are collected extensively by the local people.

Range wise distribution of forest areas under various **Forest Types** and **Sub Types** is given as under in Table 1.2.1.

**Table: 1.2.1. Forest Types and Sub-Types**

Sr. No.	Forest Types and Sub-Types.		Area under Ranges (ha.)			Total (ha.)
			Bajnath	Daroh	Palampur	
1	2	3	4	5	6	7
1	5B/C1a	Dry Siwalik Sal forests.	17.00	-	-	17.00
2	5B/C2 & 5/DS1	Northern Dry Mixed Deciduous Scrub forests.	677.93	2,297.40	435.31	3,410.68
3	9/C1a	Lower or Siwalik Chil Pine forests.	195.33	1,376.27	1,092.11	2,663.71
4	9/C1b	Upper or Himalayan Chil Pine forests.	1,511.45	204.20	2,262.76	3,978.41
5	12/C1a	Ban Oak forests.	2,871.81	-	2,871.67	5,743.48
6	12/C1c	Moist Deodar forests.	-	-	4.30	4.30
7	12/C1d	Western Mixed Coniferous forests.	2,190.99	-	468.13	2,659.12
8	12/C2a	Kharsu Oak forests.	2,917.57	-	-	2,917.57
9	12/DS2	Himalayan Temperate Parkland.	-	-	31.58	31.58
10	14/DS1	Sub-Alpine Pastures.	-	-	303.80	303.80
11	15/C1	Birch Rhododendron Scrub.	170.02	-	1,090.14	1,260.16
12	12/2SI	Low Level Blue Pine forests.	-	-	0.73	0.73

**1.2.3. GENERAL DESCRIPTION OF THE GROWING STOCK:** - The compartment history files contain the description of growing stock of individual compartment / sub-compartments. By and large Chil is the most economic conifer species followed by Kail, Spruce and Fir. In broadleaved species Ban oak has edge over other species on account of charcoal making followed by misc. scrub vegetation. Chil is of III quality. Kail is of II quality. The density of growing stock varies from 0.1 to 0.8 and has been recorded occularly for each compartment/sub-compartment in respective compartment history files. Upper or Himalayan Chil Pine forests have better quality, density and regeneration in comparison to Lower Chil Pine forests. Lower Chil Pine forests are burnt frequently in open stocking and deficient regeneration. All age classes represent Chil forests and regeneration is satisfactory. Fire protection and closure to grazing are essential for successful Chil regeneration. Kail forests are with moderate stocking and middle to mature age groups predominates. Controlled grazing and frequent removal of undergrowth is prerequisite for successful deodar regeneration. Oak forests are well stocked except near habitations, where Ban oak trees are heavily lopped. All age classes represent these forests; regeneration is satisfactory in Ban oak and deficient in Kharsu oak due to heavy grazing. Dry mixed deciduous scrub forests are of poor quality, open density, mostly degraded with deficient regeneration.

Range wise distribution of area under various species in different category of forests is given in Table 1.2.2.

**Table 1.2.2 Range wise Distribution of Area under various Species.**

Range	Area under diff. Species.	D.P.F.'s	U.P.F.'s	U.F.'s	C.F.S.	Total.
1	2	3	4	5	6	7
<b>Bajnath</b>	Gross Area.	1,855.79	1,469.63	11,355.79	-	14,681.21
	Included cultivation.	27.42	48.58	28.70	-	104.70
	Net Area	1,828.37	1,421.05	11,327.09	-	14,576.51
	Misc. Broad-leaved.	112.24	219.23	524.38	-	855.85
	Chil	258.32	690.75	766.81	-	1,715.88
	Ban oak.	843.98	98.17	1,929.66	-	2,871.81
	Deodar.	-	-	-	-	-
	Kail.	-	-	-	-	-
	Fir/Spruce.	199.52	-	1,991.47	-	2,190.99
	Kharsu oak.	235.88	-	2,681.69	-	2,917.57
	Culturable blanks.	118.84	411.43	828.47	-	1,358.74
	Un-culturable blanks.	59.59	-	2,601.93	-	2,661.52
	Area transferred under Forest Conservation Act.	-	1.47	2.68	-	4.15
<b>Palampur</b>	Gross Area.	7,796.71	2,678.21	6,767.89	1,302.17	118,544.98
	Included cultivation.	33.40	87.28	17.39	1.20	139.27
	Net Area	7,763.31	2,590.93	6,750.50	1,300.97	18,405.71
	Misc. Broad-leaved.	1,126.24	187.12	412.30	131.04	1,856.70
	Chil	889.42	1,209.17	384.73	866.57	3,349.89
	Ban oak.	1,748.63	36.44	1,082.55	4.05	2,871.67
	Deodar.	-	2.30	2.00	-	4.30
	Kail.	-	-	0.73	-	0.73
	Fir/Spruce.	235.08	-	233.05	-	468.13
	Kharsu oak.	-	-	-	-	-
	Culturable blanks.	925.03	1,125.35	344.53	297.41	2,692.32
	Un-culturable blanks.	2,829.91	30.44	4,290.81	1.89	7,153.05
	Area transferred under Forest Conservation Act.	9.00	0.11	-	0.008	9.118
<b>Droh.</b>	Gross Area.	1,030.00	4,006.15	-	874.34	5,910.49
	Included cultivation.	1.23	85.97	-	-	87.20
	Net Area	1,028.77	3,920.18	-	874.34	5,823.29
	Misc. Broad-leaved.	659.39	1,206.95	-	46.07	1,912.41
	Chil	250.02	1,082.46	-	253.02	1,585.50
	Ban oak.	-	-	-	-	-
	Deodar.	-	-	-	-	-
	Kail.	-	-	-	-	-
	Fir/Spruce.	-	-	-	-	-
	Kharsu oak.	-	-	-	-	-
	Culturable blanks.	112.36	1,529.52	-	193.07	1,834.95
	Un-culturable blanks.	7.00	101.25	-	1.19	109.44
	Area transferred under Forest Conservation Act.	-	-	-	0.99	0.99

From the above table it is evident that a vast area 9,924.01 ha. i.e. 25.57 % of the net forest area, is under unculturable waste, being either pure rocky outcrop, snow bound or above the tree limit. This area cannot be brought under tree cover. About 5,767.15 ha i.e. 14.86 % only is under culturable blank to which the green cover can be extended. These culturable blanks along with other wooded areas of low-density i.e. 0.3 and below are potential areas for raising plantations.

**1.2.4. INJURIES TO WHICH CROP IS LIABLE:** - The trees liable to injuries are due to following causes: -

- (a) Natural
- (b) Man made
- (c) Wild animals and insects
- (d) Plants (fungi, climbers and weeds).

**1.2.4.1. NATURAL CAUSES:** - Among natural causes are drought, frost, snow, wind, lightening, hailstorm, and discussed as under: -

**Drought:** - It is dreaded of all the unfavourable climatic factors. The pre and post monsoon droughts play an important role in the success of natural and artificial regeneration. Damage to Chil, Kail and Deodar seedlings is noticeable during severe droughts. The pre-monsoon drought leads to forests fires. Long drought causes heavy mortality of seedlings of all types. It also affects the production, growth and development of coppice shoots and young plants. It increases fire hazards and affects seed production. Droughts are quite common in the low-lying scrub and Chil areas. The heavy incidence of grazing and grass cuttings aggravates bad effects of drought.

**Frost:** - The frost is common causing severe damage to Khair seedlings and limited damage to deodar plantations. Damage due to drought is also severe in nurseries and young plantations. Due to excessive frost many nurseries and even naturally growing seedlings in the forest are dried up. The damage is caused to the seedlings due to "**frost lift**" especially in nurseries. It occurs due to moisture in the soil on a frosty night, gets frozen and converted into ice whose volume is more. This results in the soil being lifted up along-with plants growing on it. As the plants are lifted from their original position, their root gets dislodged and severed from the soil. This phenomenon is known as frost lift.

**Snow:** - Damage from snow is not of much significance and is generally confined to high altitude forests of Oaks. It causes trees to break. Snow damage is more severe if accompanied by strong wind, resulting in to glaciers. The heavy weight of snow causes characteristics bend at the base of trees which is very prominent in oaks and conifers growing on slopes. The young plantations also suffer adversely by snow.



**Wind:** - Windstorm causes considerable damage to the standing trees particularly deeply tapped Chil trees, which are snapped. Winds accompanied with snow in upper reaches of Baijnath and Palampur ranges causes considerable damage to Fir/Spruce trees. Besides, forests, roadside trees are uprooted. The damage to Chil trees has become a regular feature, which are uprooted and broken. Individual trees are occasionally thrown down by wind.

**Lightening:** - This type of injury is common in high mountain trees, which mostly struck by lightening, split, damaged and die.

**Hailstorm:** - Severe hailstorm can strip off the leaves, needles of trees and can cause a temporary set back. Hailstorms are quite common and a regular feature in the foothills of the main range during late March, April and early May, thus causes considerable damage at the growing season.

**Erosion:** - Sheet, rill and gully erosion is a common feature in “Changer” area. Landslides, slips and bank erosion are prevalent in high hills. At places the existing forests are damaged due to soil erosion.

#### **1.2.4.2.MAN MADE CAUSES:** - Man made causes are discussed as under:

**Fire:** - A great deal of damage is done in Chil forests. Fires cause great damage to regeneration areas. The young regeneration and plantation areas are completely wiped out by fire. In Chil forests, fire damage the standing trees, which become susceptible to wind fall. Fires also affect fertilization and seed production to a considerable extent. An early summer fire burns fertilization of cones and thus reduces the seed production, while a late summer fire burns the seed of that year and also reduces the germinating potential of seeds in the cones of succeeding year. The year wise number of forest fires and extent of area burnt, since the creation of Palampur Division is given in Table 1.2.3.

Fire protection is neglected most often. It is left unattended, by the passers by, graziers or labourers working in the vicinity. Laying fire lines can minimize fires. There is a network of fire lines in the division. These are however, not maintained and have thus been rendered totally useless. The control burning of Chil forests during winter season reduces the incidence of fires. Incidentally the department has also abandoned this practice.

**Table 1.2.3 Forest fires and area burnt (ha)**

<b>Year.</b>	<b>No. of forest fires.</b>	<b>Area burnt in ha.</b>
<b>1</b>	<b>2</b>	<b>3</b>
1978-79	1	7.0
1979-80	4	229.0
1980-81	43	643.69
1981-82	8	393.58
1982-83	1	0.50
1983-84	Nil	Nil
1984-85	160	2317.19
1985-86	33	221.50
1986-87	5	20.58
1987-88	1	2.00
1988-89	121	1022.33
1989-90	Nil	Nil
1990-91	2	5.00
1991-92	37	247.50
1992-93	18	225.04
1993-94	14	41.80
1994-95	11	123.50
1995-96	64	1164.17
1996-97	11	13.75
1997-98	13	11.39
1998-99	29	123.50
1999-2000	131	1030.52
2000-01	Nil	Nil
2001-02	Nil	Nil
2002-03	40	224.50
2003-04	29	147.25
2004-05	13	81.00
2005-06	5	20.05
2006-07	10	187.32
2007-08	46	205.25
2008-09	25	140.29
2009-10	100	598.86
<b>Total</b>	<b>975</b>	<b>9448.06</b>

Source: Old working Plan and Forest Division Palampur.

**Lopping:** - The local people lop trees for fuel, fodder, and animal beddings. This damage is restricted close to habitation. Most vulnerable are fodder trees, i.e. oaks ohi and toon as well as other broad-leaved trees. Spruce, Kail and Chil trees are also lopped for procuring manure by spreading needles under cattle. Rules regarding the exercise of this right are adequate but enforcement generally lacks. Many high forests have been transformed to Oak scrubs. Lopping affects seed production and is a predisposing cause of fungus attack. Ban oak forests near habitations are lopped so mercilessly that the trees are reduced just to telegraph posts and give a shabby look.

**Grass cutting:** - It is extensive all over the division and does little harm as compared to grazing. It is generally favoured as it reduces fire hazards in forests

closed for regeneration. But sometimes in regeneration areas and new plantations, it causes more damage as many a small seedlings and plants are undoubtedly, cut with the grasses. If done under the supervision of staff and with care, grass cutting is not a serious menace.

**Breaking of land:** - For agricultural, non-forestry and horticultural purposes Un-delimited and un-classed forests having no definite delineation of boundary on the ground are much prone to this menace. The nautors granted in these forests serves as a foothold for further encroachments.

**Grazing:** - Controlled grazing is useful to forests as it keeps weeds at low level and rakes soil for seedbed. But forests adjoining to habitations suffer from excessive grazing, which is inimical to forest growth. Many species such as Oaks, and Deodar try to come up naturally but are not able to overcome grazing pressure. Excessive grazing also leads to soil erosion. Grazing in alpine pastures does not cause much damage but a good deal of damage is done to lower forests during transit. In Chil forests heavy incidence of grazing destroys the natural regeneration by way of browsing, trampling and compacting the soil. In addition to sheep and goats kept by the local inhabitants, about 1.5 lac sheep and goats belonging to the migratory graziers pass through and graze in the forests of this division during summer months. This has very adverse affect on regeneration of forests in this area. The grazing incidence is very much above the carrying capacity of the forests. Therefore, effective closure against grazing is always a necessity for natural and artificial regeneration.

**Defective cultivation:** - Defective cultivation practices on steep slopes, without proper terracing and bunding, are source of erosion and landslips, which damage the adjoining forests. Young plantations and other regeneration areas are the worst affected.

**Torchwood extraction:** - Its extraction from the basal portion of the Kail, Deodar and Chil causes appreciable damage to the tress. This practices especially in the upper reaches of Palampur and Bajnath ranges is causing serious threat to Kail and Deodar trees near habitations.

**Resin tapping:** - Illicit and defective tapping has done considerable damage to Chil forests. The lower diameter trees are tapped illicitly and defectively. This renders the trees weak at the base, which breaks during strong wind. Excessive application of acid also results in drying of Chil trees. Supplemented by fires, the damage has reduced the density of Chil forests.

**Developmental activities:** - Construction of roads, hydro-electric projects, electric transmission lines and water supply lines not only increase the hazards of erosion and land loss but also affect the existing vegetation adversely. Undoubtedly these are important activities for economic development and well being of the population of area but these activities are major source of loss / shrinkage of area under forest cover. These constructions cause severe damage to forests not only by way of submergence and clearance of forest area but also by completely changing the ecological states of the adjoining forests.

**1.2.4.3. WILD ANIMALS AND INSECTS:** - Wild animals and insects causing injuries to crop are as under:

**Wild animals:** - Wild animals, sometimes do damage to trees. **Wild boars** and **Porcupines** dig the roots of young plants of Deodar, Kail and chil and do considerable damage to young plantations. They also eat new bamboo shoots and girdle the base of Khair trees. **Monkeys** uproot Chil and Ban oak seedlings and eat the bark of roots. **Langoors** and **Flying Squirrels** eat up the seeds from the cones of conifers and acorns of oaks. Nurseries are most susceptible to the damage of **Monkeys, Porcupines, and FlyingSquirrels**.

**Birds:** - **The Himalayan nutcracker** does maximum damage to the cones of Kail, Spruce, Fir and Chil by eating of seeds. Pheasants namely **Koklas, Monal, Kalij**, sometimes eat up the seeds from nurseries and areas sown with Deodar, Kail and Chil.

**Insects:** - The insects play havoc at the nursery stage. **Cock chaffers** are great nuisance in nurseries and cut off young seedlings at the collar and cause immense damage. Insect and pests attack foliage, branches and wood of oaks. **Agrotisypsilon** kills young Deodar seedlings in nurseries by cutting them at ground level. **Apodermus incana** (oak leaf roller) attacks young leaves of oak. Spruce is affected by budworm, **Eucosmahypidryas**. The **Phytopagus chalcid** forms galls on Spruce and Deodar needles. Other insects causing injuries to forest crop are **Hypophyla robusta** (chil bark borer) and **Hypoela subsatura** form galls on tender shoots of Ban oak. Insect pest of trees are given in Table: 1.2.4.

**Table: 1.2.4. Insect pests of trees in Palampur Forest Division**

<b>Pest Species</b>	<b>Common name</b>	<b>Family</b>	<b>Host Plant</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<i>Curculio sikkimensis</i>	Borer	Curculionidae	<i>Quercus leucotrichophora</i> (Acorn)
<i>Sitophilus glandium</i>	Borer	-do-	-do-
<i>Hypsipyla robusta</i>	Borer	Pyrallidae	<i>Toona ciliata</i>
<i>Apriona cinerea</i>	Borer	Cerambycidae	<i>Populus deltoides</i>
<i>Chrysomella populi</i>	Defoliator	Chrysomellidae	<i>Populus</i> spp.
<i>Plagiodera versicolora</i>	Defoliator	-do-	<i>Populus</i> and <i>Salix</i> spp.
<i>Dioryctria obeitella</i>	Borer	Pyralidae	Conifers (seeds and cones)
<i>Pareba vestanumella</i>	Defoliator	Nymphalidae	<i>Debregeia hypoleuca</i>
<i>Melacosoma indica</i>	Defoliator	Lasiocampidae	<i>Pistacea integerrima</i> and other b/l spp.
<i>Dinoderus</i> spp.	Defoliator	-	<i>Dendrocalamus strictus</i>
<i>Heteropsilla cubana</i>	Sucking	Psyllidae	<i>Leucaena leucocephala</i>
<i>Holotrichia</i> spp.	Soil	Scarabaeidae	Polyphagus nursery pest
<i>Brahmina</i> spp.	Soil	-do-	-do-
<i>Agrotis</i> spp.	-do-	Noctuidae	-do-

#### **1.2.4.4. PLANTS:** - Plants causing injuries to forest crop are as under:

**Fungi:** - **Fomes annosus** and **Fusarium** species attack the roots of young Deodar plants in the nurseries and forests. **Pteridium cedrii** **P. companulatum**, **P.brevius** are the needle fungi Deodar, Chil and Kail respectively. **Trametes pini** attacks the lopped Kail trees. **Arcenthodium** species attacks branches of Kail trees and are quite common in Bara Bhargal area.

**Climbers:** - **Bauhinia vahlii** is the only climber, which causes appreciable damage in dry mixed broad-leaved forests and occasionally in some Chil forests. It has engulfed the standing crop in **P.21 P. Andretta** forest of Baijnath range. Climbers like **Clematis Montana**, **Hedera helix**, **Vitis** species; **Rosa moschata** and **Cuscuta reflexa** do a little damage in Deodar Kail and broad-leaved forests by suppressing young pole crop.

**Weeds:** - In lower hills weeds like **Lantana camara**, **Eupatorium**, **Ageratum**, and **Congress grass** have become the menace to forest growth in Droh and Palampur ranges. The highly dense mat formed by **Strobilanthes**, and **Polygonum** obstructs the regeneration of high-level conifers by preventing the seeds to reach the soil. In opened areas bushes like **Rosa moschata**, **Rubus ellipticus**, **Berberis** species, **Desmodium elegans**, **Indigofera** species, **Rumex nepalensis**, **Urtica dioica**, **Gerardinia heterophylla** cover the blanks and make regeneration efforts difficult. In plantations, such bushes smother the young plants and obstruct their proper growth.

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## CHAPTER-II B (FOREST FAUNA)

**1.2.5. General Description:** A wide range in altitude with varied tropical to temperate flora offers diverse type of wild animals and birds capable of thriving under different climatic conditions ranging from tropical to arctic climate and from densely wooded area to sparse tree growth. The undisturbed forests in the past gave safe harbourage to wild creatures and provided guarantee of their survival. With the advancement of civilization, there are hardly few forests left free from biotic interference. This has a disastrous effect on the wildlife. The increase in human population and breaking of forestlands for agriculture has also reduced the domain available to the wildlife. The kharsu forests are harbouring musk deer, serrow, panther, black bear, tragopan, chukor and monal etc. The lower areas are supporting ghoral, barking deer, koklash, partridge, red jungle fowl and khalij etc. The important wildlife species are described below:

### 1.2.6. WILD-ANIMALS:

**Leopard or panther (*Panthera pardus*):** - It is also known as **Bagh, Mirg** and **Bragh**. It is found upto an elevation of 2500 meters and is not restricted to forests or heavy cover like tigers but thrive as well in open country as among rocky hills and scrubs. It is bolder than tiger. A typical leopard is a sleek shorthaired animal with a fulvous or bright fulvous coat marked with small close-set black rosettes. The tail is also more or less ringed. It varies in size; an average male is about 2 meters long weighing about 57 kg. Being more tolerant of the sun they frequently hunt by day, particularly if they have failed to secure food at night. The Leopard will kill and eat anything it can overpower with safety, cattle, deer, monkeys, the smaller beasts of prey, and larger rodents, like porcupines. Leopard's habits bring it into far more frequent contact with man, and as such it has become a greater potential scourge on human life and property. Leopards living near human settlements, particularly outside forest areas, prey mainly on domestic animals, calves, sheep, goats, on ponies and donkeys, and quite commonly on dogs. It seldom attacks human beings without provocation. It has been ruthlessly killed for its prized skin and also for the safety of the sheep and goats in the forests. The strength of Leopard is amazing. Leopards breed all the year round and the female produces the first litter when 2 to 4 years of age. Gestation period varies from 87 to 94 days. Normally 2 cubs per litter are born occasionally 3 or 4. Eyes open between the 4<sup>th</sup> and 8<sup>th</sup> day after birth. Keeping in view the damage caused by Leopard to domestic animals the Govt. has issued directions to compensate the losses suffered by the inhabitants. This animal has been declared as protected and its shooting is strictly prohibited.

**Snow Leopard (*Panthera uncia*):** - A rare animal of higher elevations found above 3500 meters in stupendous rock and cliff. It is distinctive in the shortness of its muzzle, its high forehead, and vertical chin. The ground colour of its coat is soft grey paling to pure white on the underside. The grey is sometimes tinged with buff.

The spots are unbroken and distinct on the head, nape, and lower parts of the limbs. On the body they break up into larger, paler rosettes. These rosettes are less pronounced in the luxuriant winter coat. Newly born cubs are darker than the adults are. Lying up by day, Snow Leopards hunt at night, preying on wild sheep and goats, on musk deer, hares and other rodents, perhaps also on larger birds. In summer when the upland pastures are open to grazing, they follow their prey to these higher reaches and find opportunity to take domestic goat, sheep, or ponies from the herdsmen. At the onset of winter, it follows the general downward migration of animals, coming down with them to altitude as low as 1830 meters. The gestation period is about 3 months; young number 2 to 4. In common with all other creatures that Nature has given a special endowment of beauty, Snow Leopards are persistently sought after and hunted for their valuable fur. The animal has been declared as protected and rare species.

**The Himalayan Black Bear (*Ursus thibetanus*):** - The Himalayan Black Bear is a huge animal and is found in almost all the forests between 1500 to 3000 meters above the sea level. During summer they may be found near the limits of tree line (3050-3660) above sea level, but in winter most of them come down to lower valleys. Steep forested hills are the favoured habitat of this animal. The Himalayan Black Bear spends the day sleeping in a rock cave or in the hollow of a tree. It comes out at dusk to seek its food and retires after sunrise. It has a thick coat of black hair, very characteristic is the V-shaped breast mark, which may be white, yellow or buff. The males may measure 140 to 195 cm. in length and weigh up to 250 kg. Females are little smaller and lighter. Bears hibernate during winter. Being omnivorous it lives on variety of food such as wild fruits, berries, honey, insects, rodents, even birds and small mammals. Insects, termites and the larvae of beetles provide variety to this diet. During Monsoon these animals come down to maize fields and do considerable harm to crop. It is very furious when provoked. Females are more dangerous than males. The mating season is late autumn. The cubs are produced late in the winter and early in the spring, in the shelter of thick undergrowth or in a cave or hollow tree. The young usually two or more remain with the mother for a year or more; which explains parties of four or more of these bears seen together. They probably include litters of two or successive seasons.

**The Brown Bear (*Ursus arctos*):** - The Brown Bear is generally found above 3500 meters, it is of moderate built and varies in length from 170 cm. to 230 cm. females are smaller and lighter in weight. Its heavier built and brown coat distinguishes it from the Himalayan Black Bear. It is locally known as **lal bhalu** or **siala reech**. White cotton on the chest is very prominent. The females are lighter in colour than the males. The bare open peaks above the tree line are the usual haunts of these bears. Emerging from their winter sleep in the spring, they follow the melting snows up to their perpetual level. At this season and in the early summer they graze like cattle on the newly grown grass, and spend much of their time turning over stones to look for insects, or hunting voles and marmots, which they dug out of their burrows. It is a time when food is not plentiful and even carrion may be eaten. When summer has set in individuals take to killing sheep,

goats and ponies, which are brought to the high pastures to graze. It never attacks human beings unless provoked. In fruiting season it feeds upon berries, and wild fruits in the forests, apricots, peaches, apples, and walnuts etc. in the orchards. During winter it retreats to caves remaining in the state of torpid sleep. Mating takes place in the early summer, in May or June. The cubs are born within the snug winter retreat. Cubing time is usually in December and January. It damages crops at higher elevations. The animal is prized for its skin and fats.

**Ghoral (*Nemorhaedus goral*):** - A stocky goat like animal, hair coarse, forming a small crest on the neck. Its height at shoulder is about 65 to 70 cm. and 25 to 30 kg. in weight. It is locally known as “**pij**”. Ghoral have short insignificant horns. They diverge slightly, curve backwards, and are marked with rings or ridges for the greater part of their length. It favours an elevation of 900 to 2750 meters; though they may ascend to 4250 meters elevation. They usually associate in small parties of four to eight feeding on rugged grassy hillsides, or rocky ground in forest, usually in the mornings and evenings and in cloudy weather at all hours. The mating season is from October to December and young ones are born in May, June. The others repeat the loud ‘hiss’ given when one is alarmed. It is hunted mostly in winter when the forests are covered under snow and it descends to the lower elevations.

**The Barking Deer (*Muntiacus muntjak*):** - It is known as “**kakar**” and normally met within the elevation of 900 to 2450 meters and sometimes even higher. Its height at shoulder of an adult is from 50 to 75 cm. And weight is about 22 to 23 kg. The antlers are small, consisting of a short brow-tine and an unbranched beam. Old males are browner in colour. The upper canines are well developed in males and are used by the animal in self-defence. It prefers wooded areas and come out to graze in the outskirts of forests or in open clearings. It is a solitary animal, rarely found in pairs or small parties. They are fairly diurnal habit. The food consists of various leaves and grasses and wild fruits. The call from a distance sounds much like the bark of a dog. It is given out at intervals, usually in the mornings and evenings, sometimes after nightfall. When alarmed it give out a series of short cackling barks. It appears to breed at all seasons. The rut mainly takes place in cold weather. The young, usually one, sometimes two, are born at the beginning of the rains. Horns are shed during May and June. During winter it descends down. Being small in height, it cannot run fast on snow and gets stuck up and gunned down easily. It sought after animal for its meat. The destruction of the habitat of this animal is reason for its reduced population.

**Musk Deer (*Moschus moschifera*):** - A small animal found on steep slopes above 2500 meters elevations and locally known as “**kastura**”. These animals lead solitary and secretive life and generally inhabit steep and rocky slopes. The general colour is a shade of rich dark brown speckled with grey. It has especially mobile feet, the long pointed central hooves and usually large lateral hooves being well adapted to give it a foothold on snowy slopes and slippery rocks. It is very agile and run very fast due to especially mobile feet and is not easy to shoot. Musk deer live



singly or in pairs and are generally met with in birch forests above the zone of pines; at times they come down to lower levels, but always prefer thick forests. The food consists of grass, lichens, leaves and flowers. The breeding season is believed to be in January and the young ones are born in June. It is much sought after for its musk gland situated beneath the skin of abdomen of the males. It has been declared as a protected animal and its shooting and capturing is prohibited.

**The Ibex (*Capra ibex*):** - Commonly called as Himalayan Ibex and locally known as “tangrol”, is by far most well known of the Himalayan game animals. It is found around 3600 meters elevation. It is an agile and graceful animal and runs fast. The male is with great beard and a coat of coarse brittle hairs. In winter, a dense under-fur of wool helps it to withstand the intense cold of its native mountains. The colour is variable. In general winter coat is yellowish white, more or less tinged with brown and grey. In summer, the general hue is dark brown with irregular white patches. The female is yellowish brown and insignificant to look at. The favourite grounds of Ibex lie in the higher elevations above the tree line. In the spring they are found low below the snow line attracted by new grass sprouting in patches on the steep slopes of the nallahs. They graze early in the morning, and again in the evening. The males and females generally live in separate herds. The male mixes up with the female in October when the rut commences. The young ones are born in May-June and usually as twins. Protected by an in vesture of dense under wool, Ibex are little affected by cold, and even in winter do not descend to the lower levels, but resort to the steeper slopes where the snow does not lie so deep. They are hunted for their soft woolly under fur.

**The Bharal or Blue Sheep (*Pseudois nayaur*):** - It is found in the higher elevations, neighbouring on 4880 meters in summer and rarely below 3660 meters in winter. They are mostly at levels between the tree and snow line, where there is rich and abundant grass. In structure and habits the Bharal holds a place intermediate between sheep and goat. Its horns are rounded and smooth, and curve backwards over the neck. It has no face glands. The general colour of the head and upper part is brownish grey and suffused with slaty blue, browner in summer and more distinctly slaty grey in winter. It prefers grassy slopes and rocky grounds. They never enter forest or scrub. Bharal feed and rest alternately during the day. It is timid and watchful animal and one and more are always on the lookout duty while others graze, giving a shrill whistle when alarmed. In summer they live in flocks of 10 to 40 or 50 animals, but sometimes as many as 200 may assemble. In Rutting commences in September when old rams rejoin the females and younger males. The larger flocks now break into small parties consisting of a ram and his harem of wives accompanied by immature males. The young ones are born in June –July delivering two lambs at a time.

**The Himalayan Tahr (*Hemitragus jemlahicus*):** - A wild goat with a finely formed head, narrow erects ears, a heavy body, and robust limbs. The hair on the head and face is short. The body is covered with tangled masses of coarse, flowing hair. On the neck and shoulders it grows a mane, which sweeps down to the knees.

The colour is variable. Generally it is deep reddish brown, and there is a dark mid dorsal streak, not always distinct. The horns are short and close-set. They are found in several vegetation types between 2500 meters to 4400 meters, their favourite habitat is a precipitous terrain of towering cliffs, rocky, dense scrub and forest. They bury themselves in the forests of oaks and emerge from such shelter only in the evening and are never found outside it after the sun has well risen. Tahr lives in herds. In the late summer, the old males live away from the herds; they rejoin the female in the autumn. They rut in the winter and fight savagely for the possession of the females. The young ones are born in May and June. The flesh of the female's tahr is excellent, but that of old males are rank with a strong goatly scent. Nevertheless it is much relished by local people.

**The Sambar (*Cervus unicolor*):** - Locally known as **Rall** in most part of the state, is found in the lower areas; length of the animal is about 3 meters, height at shoulder about 1.5 meters and weight of full grown stag is about 225 to 320 kg. It is dark brown in colour. The under parts are paler. Females are lighter in tone. Old stags tend to become very dark, almost black. The antlers are stout and rugged. Sambar is rarely found associating in large number. Four or five to a dozen are what one usually sees. The male has horns with basal antlers coming out directly from the base and pointing upward and outward. The horns commence to grow in May and are in velvet during the rains and clear of velvet by November. The males fight for territory. Forested hillsides preferably near cultivation, are the favourite haunt of the Sambar. They feed mainly at night and retire into heavy cover at daybreak. Pairing takes place in November and December. The stag's harem is limited to a few hinds. After the rut he deserts them and lives a solitary life till the return of the mating season. The young are born at the commencement of rains, in late May or early June. Young stags remains with the hinds.

**The Indian Wild Boar (*Sus scrofa*):** - It is found in the lower hills and known as **"Jungli Suar"** The colour of the animal is black mixed with grey, rusty brown and white hairs. It lives in grass or scanty bush jungle, sometimes in forest; after the rains, quite commonly in high crops. They are omnivorous, living on crops, roots, tubers, insects, snakes and carrion. They feed in the early morning and late in the evening. The sense of smell is acute. Wild Boar is highly prolific. They apparently breed at all seasons. The period of gestation is said to four months; four to six young are born at a time. The mother shelters them in a heaped up mass of grass or branches, which she builds before she litters. After breeding big boars lives alone or in company another of equal size or with one or two sows. It is killed for its meat, which is made into pickle.

**Common Indian Hare (*Lepus nigricollis*):** - Locally known as "khargohs" or "Serru" is found mostly in the lower areas of Droh, Palampur and Baijnath ranges. It is small size animal having about 40 to 50-cm length and weight about 1.8 to 2.3 kg. Large tracts of bush and jungle alternating with cultivating plains afford them ideal conditions. They are nocturnal but not exclusively so. It feeds on grasses, seeds, and fruits. It is said to have one to two young at a birth. Hare breeds chiefly between October and February. It is hunted for its meat.

**The Indian Porcupine (*Hystrix indica*):** - Locally known as “sayal” or “sahi”. It is frequently found all over the tract up to 2500 meters elevations. It is about 70 to 90 cm. in length and 11 to 18 kg. in weight. It favours rocky hillsides. It shelters by day in caves, amongst rocks, or in burrow dug by it. Besides the main entrance, there are usually two or three emergency exits near the mouth of burrow. Burrows are not always essential for its shelter. Porcupines come out after dark. They have keen sense of smell and display high intelligence in evading traps. When irritated or alarmed porcupines erect their spines, grunt and puff, and rattle their hollow tail quills. It is an uncommon animal and not much is known of its habits.

**The Jackal (*Canis aureus*):** - Commonly known as “Giddar” it is little smaller than the domestic dogs and grey in colour, very conspicuous due to their howling during dusk or dawn near habitations. It lives in almost any environment. The greater number lives in the lowlands, about towns and villages. Sometimes they form packs, but usually go about alone or two or more may hunt together. The hunting instinct is not wholly dormant in the Jackal; some become poultry thieves, or take to killing lambs. In season, Jackals raid sugarcane fields. They do considerable damage to the crops. Little is known about the Jackal’s family life as it is so secretive in habits. Cubs are born at any time in the year, usually in a hole in the ground, in a drain or any natural shelter. The duration/age is about 12 years.

**The Red Fox (*Vulpes vulpes*):** - **Lomari** is an animal known for its cunning and agility. It is little smaller than Jackal and richly red in colour. It is common in brushwood and cultivated lands. It lives mostly on rodents, insect’s marmots and even on flying squirrels. Fawns of breaking deers are also sometimes hunted and devoured by foxes. Red foxes are said to pair for life. A pair may occupy the same den year after year. Six to seven cubs are produced. Cubbing time is in the spring and by the late summer the cubs are well grown and able to fend for themselves.

**The Jungle Cat (*Felis chaus*):** - It is known as “jungli billi” slightly bigger than the domestic cat and has long legs and comparatively short tail. The colour of its fur varies from sandy grey to yellowish grey. Its habitat is forest fringes, grasslands, and scrub jungles, rocky outcrop and reedy banks of rivers. It preys on small mammals, birds and when near villages on poultry. Births have been recorded between January –April and in August and November. Litter size is usually three but occasionally up to five kittens.

**The Leopard Cat (*Felis bengalensis*):** - It is known as “Chita billi” about the size domestic cat with rather longer legs. Its colour and markings give it the aspect of a miniature panther. The prevailing color of the body is yellowish above, white below, ornamented throughout with black or brownish spots. It is nocturnal in habit and seldom seen. It preys on small birds and animals. Hollows in trees are a favourable shelter. It frequents grasslands, scrub, and jungle and is to some extent arboreal in habits. The litter consists of two to three kittens.

**The Himalayan Palm Civet (*Paguma larvata*):** - It is a little larger than the common house cat and is blackish in colour and under parts white. It lives in mountain and hill forests sheltering in holes in trees, and hunting its food in the treetops or on the ground. It lives mainly on fruits but also preys on small animals and birds.

**The Common Otter (*Lutra lutra*):** - Locally known as “Udbilao” and lives along the river and perennial khads. It makes its lair among rocks and boulders, in hollows beneath the roots of trees growing by the water’s edge. Bones and scales of fish, and the web footed tracks of the animal round the den show whether the animal is in residence or not. Fish is their main food. Failing fish, crabs, and other crustaceans, frogs, rodents and waterfowl are eaten. Little is known for certain of the breeding habits of these animals. Mating may take place in the water. The period of gestation is about 61 days. The young remain with the parents till nearly full-grown. Otters are easily tamed.

**The Common Mongoose (*Herpetes edwardsi*):** - It is light grey to dusty brown small animal locally called “Neola”. This is not a creature of forest, but of open lands, of scrub jungle, and cultivation. They prey on rats, and mice, on snakes, lizards and frogs, insects, scorpions, and centipedes, in fact on anything that can be overcome. The common mongoose breeds all the year round and three litters may be produced in a year. The period of gestation is about 60 days.

**Flying Squirrel (*Atausista inicnatus*):** - This nocturnal animal is found up to 1500-meter elevations. It eats fruits and cones of forest trees. This animal is shot for its soft skin.

**The Monkey (*Macaca Mulata*):** - The common species found are Rhesus mairona- Bander, which is in plenty all over due to protection afforded to it on religious grounds. Seated a male rhesus is about 60 cm. High scales about 7 to 10 kg. Large troops live near or in villages and towns and groves round tanks and temples. In the jungle, they usually keep to the outskirts rarely penetrating in to the depths, except where driven to seek denser cover. Almost everywhere the Rhesus enjoys freedom from molestation. It is a common sight to see these monkeys mingling with the human element. To raid fields and gardens in the morning and Evening is their common and established habit. The Rhesus shows a definite breeding season, correlated with climatic conditions. Mating was noted in all months of the year except March but greater frequency was from October to December. A major birth season is March to June.

**The Common Langur (*Presbytis entellus*):** - This is long limbed, long tailed, black-faced monkey seen from almost plains to 3660 meters. Seated this langur is 60 to 75 cm. high, tail, 90 to 100 cm. Long. Langurs are more arboreal in habit than macaques, but also have taken to living on rocks and cliffs. Langurs are pure vegetarians; they eat wild fruits, flowers, buds, shoots, and leaves. Feeding commences at dawn. The hottest hours of the day are spent resting in some shady

grove or nallah. They live in peaceful, relaxed, and fairly stable groups of all ages and both sexes. The average group size is 18 to 25. There is marked breeding season with a peak birth period in April-May though young are seen from February onwards. The gestation period is approximately six months. A female becomes sexually receptive when three and half years old and may have young every two years.

**1.2.7. BIRDS:** - The game birds commonly found in the tract are described as under:

**Monal (*Lophophorus impejanus*):** - Monal is prettiest of all the birds found in the tract. Its habitat lies above 2500 meters extending up to snow line in summer descending to lower altitudes during winter. It is frequently found in Fir, Spruce and Deodar, Kail and Oak forests but occasionally makes appearance in the vicinity of grassy glades. It is of the size of large domestic fowl with a short, broad and square out tail. It is characterised by brilliant metallic green head, the glistening purple upper part, cinnamon coloured tail and velvety black breast and a crest of beautiful feathers. The female looks like a huge partridge, plain brown in colour. It is mottled and streaked dark and pale with a white throat and short crest of normal feathers. When flushed the female flies to the nearest trees and perches on a bough convenient to her and such is easy to shot. It breeds in May and June. Monal eats tubers and seeds in temperate and alpine pastures. In autumn it feeds on grubs, or maggots, roots and young shoots of various shrubs and grasses, corns and berries. In winter these migrates to lower elevations and sometimes feeds in the wheat and barley fields where these are shot indiscriminately. Though it is state bird protected by law, it is killed for its beautiful dark green plumes.

**The Koklas (*Pucrasia macrolopha*):** - It is found mostly in Deodar and sometimes in Fir zone and prefers moist wooded forests with undergrowth. This pheasant is a nice table bird. The male has dark green head with fawn coloured central crest and a white spot on each side of the neck at the commencement of head. The front of the neck, breast and belly are of chestnut colour. The rest of the body is streaked with black and grey. The tail feathers are black with narrow tips with central part reddish brown. The female is mottled with black and brown with buff streaks above, eyebrows are buff and throat white. The breeding season is from April to June. In autumn and winter they are found in small flocks.

**The Cheer Pheasant (*Catreus wallichii*):** - It is a big bird about 90cm with long tail of about 60 cm. The head has long narrow pointed crest with bare red skin around the eye in both the sexes. The colour is buff white, barred with black above. The lower part is buffed barred with steely black. It has got a special preference for bushy areas and open forest. In the recent past the bird has been nearly wiped off by the poachers in some of the localities. Grass cutting and cattle grazing also heavily disturb its habitat. It has been declared as endangered species by I.U.C.N. (1979) Red data Book "Aves".

**The White Crested Kaleej (*Lophura leucomelana*):** It is known as “**Kulsha**” (male) and “**Kaleshi**” (female). The male is black above glossed with steel blue and black tail. It has a white rump, long white crest, and scarlet patch around eyes and feathers being white tipped. Most of the under surface is dirty white, the throat and belly being brown. The female is reddish brown. The male has a long narrow dropping crest of white hairy looking feathers. It is found in higher reaches in Baijnath and Uhl ranges and inhabits in thick bushes and shrubs. They nest from March to June and live in pairs of family flocks. Heavy poaching had reduced the number of birds to a great extent.

**The Red Jungle Fowl (*Gallus gallus*):** - It is known as “**Jungli Murga**” or “**Kukar**” and is common up to 2,000 m. altitude. It prefers lower scrub forests. It is a favourite bird of shikaris. It is believed to be the ancestor of all domestic fowls, found in pairs or parties. It is a very shy and cunning bird, scuttles into cover on slightest disturbance or suspicion. The male is black below and orange and red above. The tail has long coverts with dark metallic green colour hanging along each side. The wings are mixtures of glossy red, dark metallic green, black and chestnut. The hens are plain streaked brown with rufous brown under parts. It roosts on thick crowned trees or bamboo clumps; feeds on grains, vegetable shoots, insects etc. Nesting season is generally from March to May.

**The Black Partridge (*Francolinus francolinus*):** Commonly known as “**KalaTitar**”, it is found up to 1,800 m frequenting the grassy and scrub patches near cultivations. It is a small game bird, about half the size of a village hen, generally black and spotted white. The hens are pale and speckled black and white. It feeds on grass seeds, grains, white ants, termites and other insects. It is a swiftly running bird relying upon its legs to escape lives singly or in pairs, nesting season is April to July.

**The Chakor (*Alectoris graeca*):** Chakor is a mountain partridge being one of the best table birds. It is a large, plump, pinkish, grey brown with rib like bars on flanks Bills and legs are crimson. Its colour on the upper part and upto breast is plain grey. The lower parts below the breast are buff and the flanks are beautifully banded with grey, buff, black and chestnut. It is distinguished at once by the beautiful bearing of flanks. The male and female are alike and in size it is bigger than house Myna measuring 35 cm. The bird is very prominent due to its call in the evening and at times even during day. It prefers the barren rocky slopes with scattered bushes and grasses. It is a resident bird of Himalayas found between 1,500 to 3,000 m. in Baijnath and Palampur ranges. Generally it is seen in parties regularly visiting the cultivated fields for food. It feeds on seeds and grain as well as tender roots, green shoots and leaves of grass and food crops and a variety of insects and larvae. The breeding season is from April to August, early at low altitudes and late in the high hills. Seven to twelve eggs are laid at a time.

**The Hill Partridge: (*Arborophila francolinus*):** It is known as “**Peora**”, found beyond chil forests upto an elevation of 2,000 m living in small flocks and roost at night. It has got special preference to bushy areas, oak forests and dense coniferous stands.

**The Grey Partridge: (*Francolinus pondicerianus*):** Locally known as “**Safed** or **Dhaula teetar**”, it is less common than Kala teetar, occasionally found in dry scrub forests. It frequents bushy jungles and cultivated lands. Its hunting is common.

**Jungle Bush Quail: (*Predicula asiatica*):** It is known as “**Bater**” and is of the size of rain quail. The bird has fulvous brown, mottled black and buff feathers above and white below. In female the lower parts are pale pinkish. It is found in open deciduous and dry scrub forests. It lives in convoys of 5 to 20 that rest together and rise suddenly when almost trodden, feeds on grass seeds, tender shoots and grains. Nesting season is not well defined; it ranges from August to April.

**The Common or Grey Quail (*Coturnix coturnix*):** It is almost the tailless partridge like bird called Bater. It is buffish-brown in colour with pale reddish brown and black streaks. It is found in pairs or parties in grassland and cultivations and hides very well in grass and bushes. It flies straight for a short distance. Their population swells during winter when they migrate from Central and Western Asia to this region. It feeds on grain, grass seeds and insects etc. Nesting season is from March to May. Rain Quail (*Contrunis coromandelica*) which migrates locally is also found in the lower regions but rather very rare.

**Blue Rock Pigeon: (*Columba livia*):** Commonly known as “**Kabutar**” has a slaty grey colour with glistening metallic green purple and magenta sheen on the neck and breast. It lives gregariously on rocky cliffs and precipices. It is found throughout the division in upper reaches. Large flocks regularly visit cultivated fields in search of food. It also lives in semi-domesticated conditions and favours old buildings and rock holes. It generally feeds on grass seeds, cereals, pulses etc. Nesting season is not well defined.

**Dove (*Streptopelia spp.*):** - Commonly known as “**Ghugi**”, it is a common dove found in pairs or small parties in open places and cultivated fields. It approaches houses and even verandah if not scared. Its flight is straight and swift. It feeds on grass seeds, grains and wild fruits. Its nesting season is also not well defined.

**The Himalayan Griffon Vulture (*Gyps himalayensis*):** -It is the largest bird with long naked neck and unfeathered baldheaded. A large gathering on an old Caracas of a domestic animal is the common sight. The other varieties of vultures observed in the tract are the Indian griffon, long billed vultures and lammergeier.

**The Black Eagle (*Ictinactus malayenges*):** -It is a grey coloured bird in size nearly equal to vulture. It lives mainly on live smaller birds, their young ones, rodents and snakes.

**The Golden Eagle (*Aquila chrysetus*):** - Also known as “**Girja**”, it is a very black looking large and powerful eagle with size of vulture seen above the tree level of rather fierce appearance with its flat head, sharply hooked beak and feathered legs armed with sharp claws. A longish tail and often-light patches in the wing and tail quills assist recognition. Its colour is deep chocolate brown. Its food is mainly large birds like pheasants, partridges and even crows. It also carries away animals like fawns of barking deer goral, must deer, foxes and martens. Frogs, Lizards and snakes are readily devoured. It avoids heavy forests and campsites.

**The Shahin Faloons (*Falco peregrinus*):** - It is larger than the house crow, slaty blue above with black head, rusty red below. Its favourite habitat is vast steep blanks with rocky outcrops. It lives mainly on chakor, partridges and other small birds. Other falcons commonly met are hobby and kestrel.

**The Forest Eagle Owl (*Huhua nepalensis*):** - It is of a vulture size and is dark brown in colour with two black horns like tuft above its head. Under parts are tawny white barred with blackish brown. This bird is of nocturnal habits and lives mainly on pheasants or large birds and small animals especially the young ones of barking deer etc. The other owls found in the area are scopes owls, great owl and sculy's wood owl.

**Parrot/Parakeet (*Psittacula himalayana*):** -This bird is found in the lower hills and is a menace as it eats away the seed of Chil by extracting it from the cones with its very strong beak.

**The Jungle Crow (*Corvus macrorhyniches*):** - It replaces the common house crow (*Corvus splendens*) as a scavenger although the house crow is also found during summers.

**Wood Pecker (*Picus squamatus*):** - This is a little scaly bellied green woodpecker, distributed through out. It is easily observed as it works its way up the trunk of a tree. Now stopping to dislodge a piece of bark and then hammering lustily with its chisel like beak at a piece of grub-infested wood. Occasionally it feeds on the ground searching there for ants and termites. The nest hole is excavated in the trunk or branch of a tree and consists of a passage running down from 50 to 75 cm into the next chamber. It is a medium sized greenish bird with pale under parts scaled with black which climbs up the trunks of trees in series of jerks, and moves from tree with noisy undulating flight.

Apart from the game birds described above there are many other birds like Tits, Nutcracker, Pies, and Fly Catcher etc.



### 1.2.8. REPTILES

#### A: SNAKES

**The Common Indian Krait (*Bangarus caeruleus*):** -It has highly polished scales. It inhabits more or less open country at low altitudes, seldom ascending above 1,500 m. A highly poisonous snake found in lower parts of Palampur and Droh Ranges.

**The Himalayan Pit Viper (*Ancistroden himalayans*):** - Also known as “Saap”, it is found between 2,000 to 3,000 m. elevation in Palampur and Baijnath Ranges. Although nocturnal in habit, it comes out at times to bask in the sun.

**The Indian Cobra (*Naja naja*):** - Locally known as “Nag”, it is found in warmer, lower hills of this division and is highly poisonous. It is very fond of water, hence found near water sources in the hot dry weather just before the break of monsoons.

**The Rat Snake (*Ptyas mucosus*):** - It is widely distributed and usually found in the open country in the vicinity of human habitations. It is the common snake in lower warmer tracts.

#### B: LIZARDS

**The Common Indian Monitor Lizards (*Varanus monitor*):** - It is found in forests as well as outskirts of villages and locally known as “Goh”.

**Girgit (*Colotus vessicoloen*):** - This is bigger than house lizards and found outside of the houses but near habitations, fields and forests, associated with vegetation. It also changes colours as per environment where it lives.

**The Common house Lizards (*Gecko hemidactylus*):** - It is found at all elevations and in almost all the buildings.

**1.2.9. INJURIES TO WHICH FAUNA IS LIABLE:** - The biggest and the only injury to which wildlife is exposed, is man himself. The other hazards to the fauna are epidemics, atmospheric influences, animals and fire. A brief resume of the damages done to the forest fauna are listed below:

**Hunting/Poaching:** - The destruction of wildlife at the hands of bonafide residents is common because a large section possesses arms although most of the arms are for crop protection, yet these are commonly used in shooting game. The animals are killed for meat or other valuable products like – fur, musk, medicines, and trophies or only for sport. Carnivorous animals are killed because they are dangerous and can harm other people and farm/domestic animals. Other animals are killed to save agricultural crops. Panther, musk deer, monal, cheer pheasants

are the endangered species in the area. The poachers have ingenious ways of poaching of game animals. Opening up of the area by more motor roads and paths is resulting in increased poaching activities.

**Dynamiting:** - The HP Public Works Department, Hydro Projects and military men get plenty of explosives for developmental works, which people use for killing fish etc. This naturally depletes the stock of fish for future crop.

**Poisoning:** - During the dry season, poisoning is practiced in water pools for over all destruction of fish in the pool. The poison is made from lime, juice of *Euphorbia royleana*, pounded seeds of *Zanthoxylum alatum* and *Caseara tomentosa* etc. These are mixed and thrown into pools and stirred up and made to mix with the water. After an hour or so fish come to the surface stupefied or dead and are removed in quantities.

**Fire:** - It plays havoc with forests fauna in the fire season. The animals get trapped in fire and perished. The eggs and young ones are destroyed in the nests, nest holes and hollows in the tree trunks and rocks and dead stumps. The entire food chain is destroyed and the pyramid structure of wildlife is broken. The habitat is rather destroyed completely.

**Epidemics:** - It is not a common feature in wildlife but Sambar and other members of deer family may suffer from infectious and contagious diseases like rinderpest etc. through domestic cattle grazing in the forests.

**Atmospheric Influences:** - The adults are seldom affected by the climatic disturbances but young ones suffer casualties mostly from frost. The fires adversely affect bird hatching. Drought causes the drying up of natural water holes.

**Animals:** - The ecological balance maintained by the predator-prey relationship has been disturbed by man. Carnivora prey on herbivora, reptiles on birds and eggs and rodents, other destroys fishes, reptiles and small birds. Shooting of particular animal species like Sambar, Kakar, and other herbivores has recoiled on depletion of food for carnivora like Panther and is one of cause for extinction.

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## CHAPTER-III UTILISATION OF THE PRODUCE

**1.3.1 AGRICULTURE CUSTOMS AND WANTS OF THE POPULATION:** -The population of the area is mostly rural and largely depends upon agriculture, forests and other developmental works for its existence. A large number of developmental activities viz, construction of roads, provision of water supply system in the villages and opening up of new schools for education of children are going around with great speed. The population has been steadily increasing and has almost doubled in last thirty years (Table 1.3.1). The tract is quite densely populated. Based on 2001 census the population density are 375 persons per square km. against 109 persons per square km. for Himachal Pradesh. The statistics of human population for the tract since 1961 census is shown in Table 1.3.1.

**Table 1.3.1: - Human Population of the Tract.**

<b>Sr. No.</b>	<b>Census Year.</b>	<b>Population.</b>
<b>1</b>	<b>2</b>	<b>3</b>
1.	1961	1,94,423
2.	1971	2,24,508
3.	1981	2,72,007
4.	1991	3,16,931
5.	2001	3,49,251

Source: District Land Records 2009-10.

The human population of the entire district since 1901 Census is tabulated as under in Table 1.3.2. (District Land Records, 2009-10) along with increase in percentage over previous census.

**Table 1.3.2: - Human Population of the entire District since 1901 Census.**

<b>Sr. No.</b>	<b>Census Year</b>	<b>Population</b>	<b>Increase % over previous census</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1	1901	4,78,364	-
2	1911	4,69,046	(-) 1.9
3	1921	4,69,251	(-)
4	1931	4,94,653	(+) 5.4
5	1941	5,63,163	(+) 13.8
6	1951	5,70,643	(+) 1.3
7	1961	6,57,232	(+) 13.2
8	1971	8,00,863	(+) 21.9
9	1981	9,90,758	(+) 32.7
10	1991	11,74,072	(+) 18.50
11	2001	13,39,030	(+) 17.54

Source: District Land Records 2009-10.

Human population of the State since 1901 census is tabulated in Table 1.3.3 (District Land Records, 2009-10) along with increase in percentage over previous census.

**Table 1.3.3.Human population of the State since 1901 Census.**

<b>Sr. No.</b>	<b>Census Year.</b>	<b>Population.</b>	<b>Increase % over previous census.</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1	1901	19,20,234	-
2	1911	18,96,944	(-) 1.22
3	1921	19,28,206	1.65
4	1931	20,29,113	5.23
5	1941	22,33,245	11.54
6	1951	23,85,981	5.42
7	1961	28,12,463	17.87
8	1971	34,60,434	23.94
9	1981	42,80,818	23.71
10	1991	51,70,877	20.79
11	2001	60,77,900	17.54

Source: District Land Records 2009-10.

To a casual observer, the tract may appear to be very sparsely populated as the habitation is generally scattered in the form of hamlets or groups of hamlets (Tikas) and the houses are almost completely hidden in clumps of trees. The population is mainly rural and mostly depends on agriculture. A good number of them earn their livelihood by rearing flocks of sheep and goats and also by serving in the armed forces for which the tract is well known. The rural population is also dependent to a great extent on the forests for many of their usual requirements. The main requirements from Government forests are: timber for house construction, fuel-wood and charcoal, wood for agricultural implements, grass and fodder for the live-stock, leaves for manure, herbs for medicinal uses etc. The forest settlement makes ample provision to meet these requirements, either free of cost or at very concessional rates. The pressure of these rights or requirements on the forests is very high and is increasing steadily. Population of the tract i.e. rural, urban, density of population, literacy rate, number of villages etc. in comparison with District and State is tabulated in Table 1.3.4. (District Land Records) as per 2001 census is as under: -

**Table 1.3.4. Break up of population as per 2001 census.**

Sr. No.	Item.	Palampur Forest Division.	Distt. Kangra.	H. P. State.
1	2	3	4	5
1.	Total population.	3,49,251	13,39,030	60,77,900
2.	Rural population.	3,45,245	12,66,745	54,82,319
3.	Urban population.	4,006	72,285	5,95,581
4.	S.C. population.	-	2,79,540	15,02,170
5.	S.T. population.	-	1,597	2,44,587
6.	Density of population.	375	233	109
7.	Literacy rate.	-	80.1	76.5
8.	Number of villages.	1,089	3,869	19,388
	(a) With habitation.			
	(b) Without habitation.	1,040	3,620	1,997
		49	249	2,391

Source: District Land Records 2009-10.

**1.3.2. LAND UTILIZATION:** - Agriculture is the main occupation of the people. There is no commercial or industrial activity in the area. The principal agricultural crops are paddy, wheat, maize, potato, pulses, suet and vegetables. Rice and wheat are main staple foods. Tea cultivation is also practised in some villages of Palampur and Baijnath Tehsils. The H.P. Agricultural University and I.H.B.T. at Palampur has also brought a marked improvement in the agricultural practices. The people supplement their income by working on developmental works and the forest operations and depend very much on the forests and forest produce. Sowing, planting, logging, soil conservation and road construction etc. provide sufficient jobs to local population. The other trades allied to agriculture are practiced and carpentry, masonry, black smithy etc. also meeting the local demands.

The local population depends largely on the forests for its existence, which provide timber for house construction and agricultural implements, fire wood, leaf fodder, litter for cattle and manure, raw material for local industries and medicinal plants. Also minor forest produce like Nirgal for mats and basket making in upper reaches of Baijnath and Palampur ranges.

**1.3.3. TEA INDUSTRY:** - Tea cultivation in Kangra was started around 1849 when Dr. Mamesion Supdt. of Botanical gardens (North West Provinces) visited Kangra district to ascertain the possibility of growing tea in Kangra. It was observed that tea could be grown in the foothills and lower slopes of Dhauladhar at an altitude ranging from 900 to 1400 meters. This resulted in the setting of three Govt. nurseries at Kangra, Nagrota and Bhawarna followed by establishment of Govt. tea plantation at Holta at an elevation of 1300 meters. Based on the figures of 1996

and published in the Tea Directory of H.P. by Tea Board of India in 1997, a total of 2312 ha. area is under tea plantation in Himachal Pradesh out of which 470 ha. is neglected and 626 ha. is abandoned tea gardens and the rest 1216 ha. is in a well-developed stage. Tehsil Palampur covers the maximum area of 1256 ha followed by Baijnath 564.40 ha. Majorities of tea plantations in Kangra are hardly 90 to 130 years old. Before 1980 most of the tea estates were in a state of neglect due to lack of finance and technical know how.

There are four tea co-operative factories at Palampur, Baijnath, Bir and Sidhbari with the capacity of 10.00 lac kgs. per year. Besides this small tea growers are manufacturing green tea in their cottage industries. The number of such industries with minimum production of 5000 Kgs. per year is around 42 units. Generally two type of tea is manufactured in Kangra, Black tea and Green tea. Each type has number of popular grades depending upon the quality. Due to establishment of tea testing labs and extension cell at Palampur there is substantial increase in production of tea in H.P. The average production of well maintained exclusive of neglected and abandoned tea area was 1407 Kgs per ha. during 1998-99. Tea production for the last five years is tabulated in Table: 1.3.5.as under.

**Table: 1.3.5. Tea Production in Kgs**

<b>Sr. No.</b>	<b>Year.</b>	<b>Quantity (Kgs.).</b>
<b>1</b>	<b>2</b>	<b>3</b>
1.	1995-96	13,58,785.00
2.	1996-97	14,23,414.00
3.	1997-98	14,42,310.00
4.	1998-99	17,11,242.00
5.	1999-2000	12,21,624.00
6.	2000-01	14,83,452.00
7.	2001-02	10,22,248.00
8.	2002-03	7,17,945.00
9.	2003-04	7,02,049.00
10.	2004-05	6,50,498.00
11.	2005-06	8,55,763.00
12.	2006-07	8,62,120.00
13.	2007-08	8,01,646.00
14.	2008-09	8,50,302.00
15.	2009-10	8,49,280.00

Source: Tea Board office Palampur.

The main wholesale market for green tea is at Amritsar. Kangra Tea Planters Marketing and Industrial Society is the sole agency for marketing of green tea for Kangra tea. The market for Black tea is Calcutta and it is sold through brokers.

**1.3.4. LIVESTOCK:** - The people rear cattle and flocks of sheep and goats to supplement their meager agricultural income. The cattle are of poor quality and maintained mainly for manure. The Jersey Cow Breeding Centre at Palampur has brought marked improvements in the cattle breed and animal husbandry practices. The milk production is poor. Stall-feeding is uncommon. The villagers depend on forest grass and wastelands for grazing their animals throughout the year. The bullocks and dry cows are left in the forests for months together. The grazing grounds are exhausted and the harmful effects of overgrazing are apparent. The pressure of grazing per unit area is beyond the carrying capacity of the pastures and forests. Grazing in forests is practiced all over in an unrestricted manner. Alpine pasture and dhars are very heavily grazed by flocks of sheep and goats belonging to local and migratory graziers; so much so that many of these are deteriorating. People are in the habit of rearing cattle far in excess of their actual requirements. Apart from the livestock of local people a very large number, about 1.25 lac of sheep and goats belonging to the migratory graziers pass through the forests of this division while on way to Chhota and Bara Bhangal. Average incidence of grazing is 5.12 Animal Units/ha as per cattle population of 1992 census against the permissible limit of 2 sheep units/ha according to the State Grazing Advisory Committee Report. The pressure is still higher near the thickly populated villages. Trees mainly of **Ban oak, Beul, Khirk, Kachnar, Ohi**, etc. are lopped for fodder especially during winters. The livestock population in the division is given in Table 1.3.6.

**Table 1.3.6 Livestock population in Palampur Forest Division**

Year	Cattle	Buffaloes	Sheep	Goats	Misc. Horses, mules, pigs. etc.	Total
1	2	3	4	5	6	7
1966	97,646	22,517	22,662	18,796	946	1,62,567
1972	1,05,426	23,122	36,561	20,515	1,123	1,86,747
1978	1,05,701	23,355	24,642	20,000	1,421	1,75,119
1983	1,00,648	34,642	29,507	21,564	2,944	1,89,305
1992	1,09,411	25,435	83,762	66,165	2,737	2,87,510

\*Source:-Old Working Plan and District Land Records 1999.

**1.3.5. DEPENDENCE ON FORESTS:** - People generally depend on forests for their existence in various ways. The most important requirements are fuel wood, timber for construction, and timber for agricultural and other allied activities, fodder, manure and medicinal herbs.

**1.3.5.1. Fuel wood:** - People depend upon fuel wood for cooking and heating. The average per head per annum consumption of fuel wood in rural areas and urban areas has been assessed and published by the Forest Survey of India (Northern Zone) for Chil belt area of Himachal Pradesh. Their assessment is nearer to the survey conducted by I.G.C.E.D.P. Palampur in Changer area. According to Forest Survey of India report, on an average 0.83

cubic meter and 0.54 cubic meter fuel wood is consumed per head per annum in rural and urban areas respectively. It is further assumed that only 40% of fuel wood requirement come from the forests and remaining 60% is met from other resources like trees in private lands and agricultural waste etc. One cubic meter of fuel wood is taken as 728 kg. Firewood is in shortage in the main valley and the people, some-times, resort to burning of cow dung. This, however, is bound to go down because use of solar cookers, pressure cookers, smokeless chullahs, cooking gas and installation of bio gas plants is picking up. Cooking gas is being adopted in the towns.

**1.3.5.2. TIMBER:** - People largely depend on timber for construction of houses. In Kangra valley proper, houses are generally built on usual pattern, but in the higher hills of Chhota and Bara Banghal, houses are made mainly of wood, the wall being of loose stones with binders of wooden beams and roofed with shingle (phatoos) of fir and spruce. Due to increasing sources of income from variety of developmental works, the standard of living of people is gradually rising thereby leading to more and more house construction. The timber at present for bonafide domestic and agricultural purposes is being granted at zamindari rates to the right holders. The grant of timber to right holders in this division during the previous working plan period is given in **Appendix-XIII**. The figures in appendix show that the right holder's demand has vast fluctuations. Therefore, future demand is assessed on the basis of averages. The average annual demand of timber calculated on the basis of standing trees granted to right holders for the last thirteen years is as under in Table 1.3.7.

**Table: - 1.3.7. Average Annual Demand of Timber of Right Holders.**

Species	Chil	Kail	Fir / Spruce	Ban Oak	Misc. B.L.	Total
1	2	3	4	5	6	7
Average annual demand in cum.	1199.40	41.90	615.28	25.30	57.46	1939.32

In addition to it, timber in the form of standing trees is also being sold at market rates to non-right holders and other Govt. departments. The details of such standing trees sold to non-right holders and other Govt. departments are given in **Appendix-XIV** and abstract is as under in Table 1.3.8.

**Table: -1.3.8.Average Annual Demand of Timber of Non Right Holders.**

Species	Chil	Kail, Deodar	Fir / Spruce	Ban Oak	Misc. B.L.	Total
1	2	3	4	5	6	7
Average annual demand in cum.	40.24	8.07	5.10	1.34	4.85	59.60



The average annual quantity of species wise standing trees sold to non-right holders and other Govt Departments comes out to **59.60cum**. Therefore annual total local requirement of timber is given in Table 1.3.9.

**Table 1.3.9.Total Average Annual Local demand of Timber.**

Species	Chil	Kail	Deodar	Fir / Spruce	Ban oak	Misc. B.L.	Total.
1	2	3	4	5	6	7	8
Av. annual demand in cum.	1239.64	42.70	7.19	620.38	26.64	62.31	1998.92

**Thus annual local requirement of timber is 1998.92 cum. or 2000.00 cum.**

**1.3.5.3. FODDER REQUIREMENT:** - Forest is the main source of fodder to cattle. However local people mainly in “**Changer**” area have large number of fodder trees growing on their field bunds and in kharetar areas.

**1.3.6. MARKETS AND MARKETABLE PRODUCTS:** - The main marketable products from the forests of this division are discussed as under: -

**1.3.6.1. TIMBER:** - The timber exported from this division is mainly of chil, fir/spruce and some kail. Due to nationalization of forest exploitation, timber lots are marked and handed over to State Forest Corporation for extraction and further haulage to sale depots. However, chil is the only timber, which is regularly exported from this division. The main timber market is at Pathankot. The timber is sold by open auction at H.P. State Forest Corporation depots at Bhadroya and Nurpur and subsequently exported out of the state. Generally speaking, chil timber of this area is not of good quality and is, therefore, not popular in the trade. Kail and fir/spruce are available at a limited scale. Timbers of miscellaneous broad-leaved species like mango, mulberry, shisham, semal, siris etc. is consumed locally for construction and agricultural implements etc.

**1.3.6.2. RESIN:** - It is chief forest produce of this area and main source of revenue. Since 1.4.1975 the tapping operations are being done by the H.P. State Forest Corporation (Govt. **Notification No. 10-26/72 SF dated 30.5.1975**). All the workable chil forests are being tapped for resin. With the coming into force of **H.P. Resin Products (Regulation of Trade) Act, 1982** the resin from private forests is now being purchased by the Forest Corporation at the rates purposed by the Advisory Committee constituted under the Act and approved by the Govt. from time to time. Primarily Rosin and Turpentine factories at Bilaspur and Nahan consume the resin. After meeting the requirements of its factories, surplus resin is distributed among private owned factories located at Kandrori, Damtal, Hamirpur and Una.

**1.3.6.3. KATHA:** - Katha obtained from the khair trees is now in great demand in the markets at Delhi and Amritsar. Khair trees occur in the scrub forests of this division at the lower elevation in Palampur and Droh ranges. Percentage of khair trees, however, in the Government forests is very low and therefore, this is not of any considerable significance in this division. However, khair trees allowed for felling from private areas and quantity of katha exported is tabulated in Table 1.3.10.

**Table 1.3.10. Number of Khair trees allowed for felling and Katha Exported.**

Year	Khair trees allowed for felling.		Katha exported (Qtls.)
	No.	Meter Girth.	
1	2	3	4
1994-95	6712	4335.95	174.07
1995-96	8476	6190.31	82.00
1996-97	5592	3612.43	146.91
1997-98	2865	1850.79	170.21
1998-99	2514	1695.98	56.00
1999-2000	3663	2377.35	-
2000-2001	5438	3511.83	72.22
2001-02	9767	3554.23	-
2002-03	13758	8565.78	41.77
2003-04	11164	7189.35	70.50
2004-05	6982	4593.02	50.88
2005-06	11237	7573.84	34.00
2006-07	3725	2408.53	58.95
2007-08	-	-	-
2008-09	-	-	-
2009-10	12319	8199.34	-

Source: - Palampur Forest Division.

The private sale was stopped during 2008 and 2009 due to ban imposed by Hon'ble High Court of Himachal Pradesh.

**1.3.6.4. FUELWOOD AND CHARCOAL:** - The coppice coupes composed of misc. scrub species are the main source of fuel wood and charcoal, which are mainly consumed locally in various towns viz. Palampur, Baiinath, Paprola, Thural, Dheera, Khaira and Droh etc. Such forests are mainly located in lower areas of Palampur and Droh ranges. During the previous working plan period from 1984-85 to 1987-88 six coppice coupes covering an area of 69.68 ha has been exploited in this division. Chil charcoal is also converted from the unfit trees and lops and tops which finds its market in activated carbon factories at Hoshiarpur and Amritsar, and with goldsmiths. However, fuel wood and charcoal is deficient in this division and demand is met with by imports from other divisions. Quantity of fuel wood and charcoal sold from the retail sale depots of State Forest Corporation during the last five years is tabulated as under in Table 1.3.11.

**Table 1.3.11. Quantity of Fuel wood and Charcoal sold.**

Year.	Depot wise Quantity sold in Qtls.			
	Palampur.		Bajnath.	
	Fuel wood.	Charcoal.	Fuel wood	Charcoal.
1	2	3	4	5
1995-96	852.65	1.25	670.60	45.10
1996-97	1059.97	61.96	476.69	108.95
1997-98	877.19	11.37	504.69	12.82
1998-99	414.84	87.64	159.17	43.03
1999-2000	228.13	205.74	193.42	35.65
2000-01	852.65	35.00	180.60	35.00
2001-02	420.22	88.08	65.21	31.80
2002-03	148.48	98.80	150.00	30.60
2003-04	124.94	39.47	70.65	35.30
2004-05	23.25	0.20	49.23	3.66
2005-06	13.35	7.98	31.15	20.68
2006-07	5.30	5.50	35.10	9.61
2007-08	17.50	0.00	39.50	13.82
2008-09	33.70	37.00	0.00	11.02
2009-10	20.81	3.11	152.95	15.56

Source: - Forest Working Division Dharamshala

**1.3.6.5.PULPWOOD:** - Chil pulpwood from the small wood up to a minimum diameter of 10 cm. under bark is converted and auctioned to the paper and pulp mill owners located at Yamuna Nagar and Saharanpur. It is also used for making of packing cases.

**1.3.6.6.MEDICINAL HERBS:** - The main medicinal / aromatic herbs found in this division are Kasmal (**Berberis spp**), Bhang (**Cannabis sativa**), Kashmiri Patha (**Rhododendron companulatum**), Wild rose (**Rosa moschata**), Karoo (**Gentiana karoo**), Patis (**Aconitumheterophyllum**), Dhup (**Jurinea macrocephala**), Ban kakri (**Podophyllum emodii**), Banaksha (**Viola canescence**), Ban ajwain (**Thymus serphyllum**), Mushkbala (**Valeriana wallichii**), Shinghli mingli (**Dioscorea deltoides**) etc. These are collected by local people, and sold to contractors who in turn collect and export the same under licence in raw form to the markets at Amritsar and Delhi. Licence fee is charged for the collection of medicinal herbs from the forests. Export fee as fixed by the Govt. is charged when these herbs are exported out of the division. The quantity of medicinal herbs exported from this division is as under in Table: 1.3.12.

**Table: 1.3.12. Quantity of Medicinal Herbs Exported.**

<b>Year</b>	<b>Species</b>	<b>Quantity (Qtls)</b>	<b>Royalty (Rs.)</b>	<b>Export Fee (Rs.)</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>1997-98</b>				
	Brah flowers.	6.20	Not leviabale.	25/-
	Brahmi leaves.	7.43	-do-	50/-
	Karu.	12.20	6588/-	50/-
	Dhoop.	11.72	5860/-	-
	Bankakri.	1.43	644/-	-
<b>1998-99</b>				
	Shingli-mingli.	1.10	990/-	25/-
	Ban ajwain.	3.80	380/-	-
	Bueh.	0.60	78/-	-
	Bether.	66.00	3300/-	50/-
	Brahmi leaves.	138.00	Not leviabale.	25/-
	Ban kakri.	3.86	1737/-	25/-
	Karu.	31.11	16799/-	-
	Dhoop.	18.08	9400/-	-
<b>1999-2000</b>				
	Dhoop.	11.65	5825/-	25/-
	Karu.	7.35	3969/-	-
	Ban kakri.	5.28	2376/-	-
<b>2000-2001</b>				
	Brahmi leaves.	50.00	Not leviabale.	25/-
	Harad.	10.00	-do-	25/-
	Amla.	6.00	-do-	25/-
<b>2001-2002</b>				
	Harad.	10.00	Not leviabale.	25/-
	Amla.	6.00	-do-	25/-
<b>2002-2003</b>	Amla.	10.00	Not leviabale.	25/-
<b>2003-2004</b>	-	-	-	-
<b>2004-2005</b>	-	-	-	-
<b>2005-2006</b>	-	-	-	-
<b>2006-2007</b>	-	-	-	-
<b>2007-2008</b>	Harad.	60.00	Not leviabale.	25/-
	Tat Palanga.	1.00	-do-	25/-
	Ritha.	8.00	-do-	25/-
<b>2008-2009</b>				
	Dhoop.	6.00	-do-	25/-
	Karu.	12.00	3000/-	25/-
<b>2009-2010</b>				
	Karu.	12.00	6480/-	25/-

Source: - Palampur Forest Division.

**1.3.7. LINES OF EXPORT:** - With the nationalization of forests H.P. State Forest Corporation Ltd does exploitation and extraction work since 1981. Timber is carried from the forest to the roadside depots by manual labour and gravity rope way spans. Resin is carried by mules from the forests / transit depots to main depot and then it is carried by trucks to resin factories. Other forest produce such as charcoal, firewood, pulpwood etc. are carried by manual labour or mules from transit depots to main depots and then by trucks to sale depots. The area has good network of all weather metalled and un-metalled fair weather P.W.D. and forest roads. Timber and other forest products are exported by road. The main lines of export are as under: -

**1.3.7.1. ROAD:** - Roads are the main line of export from this division. A network of all weather metalled and fair weather un-metalled P.W.D. forest roads extensively cover the area. The main road i.e. Mandi-Pathankot road is the main line of export leading to Pathankot and other markets. A list of prominent forest roads is given in **Appendix-VIII**. A list of P.W.D. roads in this division is appended as **Appendix-XI**. Total length of P.W.D. roads in this Division is given as under in Table 1.3.13. and distances between important places are mentioned in Table 1.3.14.

**Table 1.3.13.Total length of P.W.D. roads in Palampur Div. (km).**

Sr. No.	Length (km.) in the Division.	Metalled.	Un-metalled.
1	2	3	4
1	1303.036	573.648	729.388

\*Source: P.W.D. records.

**Table 1.3.14.Distance (km.) between important places.**

Sr. No.	From	To	Distance (km.).
1	2	3	4
1	Palampur	Amritsar	249
2	Palampur	Delhi	537
3	Palampur	Jalandhar	195
4	Palampur	Ludhiana	248
5	Palampur	Chandigarh	280
6	Palampur	Pathankot	127
7	Palampur	Nurpur	90
8	Palampur	Yamuna Nagar	395

\*Source: P.W.D. records.

**1.3.7.2. RAILWAYS:** - The tract is connected by a narrow railway lines from Joginder Nagar to Pathankot and provides a convenient line of export for various forest produce.

**1.3.8. METHODS OF EXPLOITATION AND THEIR COST:** - The entire exploitation work of timber, resin and fuel wood/charcoal extraction is being carried out the H.P. State Forest Corporation Ltd. right from the forest to the sale depots. Standing trees and coppice coupes are handed over to the corporation who get them worked by engaging labour directly or through Labour Supply Mates. The medicinal herbs are collected by the right holders under the settlement rights and purchased by various agencies.

**1.3.8.1. TIMBER:** - Methods of exploitation are conventional. Axe or axe and saw do felling. Logging and conversion is done in situ. The trees are cut into logs of various sizes with the help of saws. The logs are further squared with the help of axe and then sawn into scantlings by using frame saw. These days non-standard sizes of timber are also being converted; lops and tops of chil are converted into pulpwood and charcoal / fuel wood on the schedule rates of H.P.S.F.C. Ltd. Directorate (North).

These rates vary considerably from forest to forest and are further likely to increase on account of rise in prices of essential commodities and labour rates.

**1.3.8.2. RESIN:** - After carrying out enumeration by the department, the forests are handed over to the Forest Corporation for tapping. The tapping in private forests is, however, done directly by the contractors on the tapping permit issued by the Forest Department. With the coming into force of **H.P. Resin Products (Regulation of Trade) act, 1982**, the resin from private forests can be sold only to H.P. Forests Corporation at the rates decided by Resin Advisory Committee constituted under the act, and approved by the Government from time to time. After meeting the requirements of its factories, the rest of resin is distributed among private owned factories.

The tapping in the govt. forests is now being done by the **“Rill Method”**, which has been described in detail in the relevant chapter. However, in the private forests still conventional method of **“Cup and Lip”**, of resin tapping is in vogue. Local labour that are well versed with the tapping technique are generally employed. A section of one thousand blazes is allotted to one mazdoor who can earn about Rs. 5000/- during the total tapping period of approximately seven months. Resin tapping thus provides seasonal gainful employment to a large number of labour.

The labourers are paid their wages for extraction of resin in a graded manner, thus, introducing a system of better work. The rates being paid by H.P. State Forest Corporation 2008-09) to the labourers are as under in Table 1.3.15.

**Table: 1.3.15. Resin Extraction Rates**

Sr. No.	Resin yield per section.	Wage Rate (Rs. / qtl.).
1	2	3
1	Up to 20.00 Qtls.	384.55
2	20.1 to 25.00 Qtls.	433.70
3	25.1 to 30.00 Qtls.	515.50
4	30.1 to 35.00 Qtls.	556.50
5	35.1 to 40.00 Qtls.	605.65
6	40.1 to 45.00 Qtls.	678.40
7	Above 45.00 Qtls.	711.95

Source: Schedule rates of H.P.S.F.C. Ltd. Directorate (North) for 2008-09.

**1.3.8.3.FUELWOOD, PULPWOOD AND CHARCOAL:** - Marked coppice coupes are handed over to H.P. State Corporation Ltd. for extraction of fuel wood and charcoal. Pulpwood is also extracted from lops and tops of chil trees.

**1.3.9.PAST AND CURRENT PRICES:** - The prices of timber and other forest produce have been steadily rising. These prices of timber for non right holders, resin at which it is supplied to private factories and fuel wood and charcoal at which these are supplied to public and government departments from sale depots managed by H.P.S.F.C. Ltd. are tabulated in Table 1.3.16.

**Table 1.3.16. Prices of Timber and other Forest Produce(Market rates)**

Year.	Prices in Rs. Per Cum. and Per Qtl.								
	Timber 305.26.13.and above. Standard sizes.				Charcoal per qtl.		Fuel wood per qtl.		Resin per qtl.
	Deo.	Kail.	Chil	F/S.	Pub.	Govt.	Pub.	Govt.	Pvt. Fac.
1	2	3	4	5	6	7	8	9	10
1991-92	14788	11698	5908	7309	264	406	86	134	1515
1992-93	15677	12406	5082	6370	264	406	86	134	2200
1939-94	15005	12870	5126	6371	280	430	90	144	2215
1994-95	19558	14122	6483	6872	280	430	90	144	1950
1995-96	20135	13852	5850	7483	382	510	123	197	2800
1996-97	27813	20863	9354	12449	382	510	123	197	3200
1997-98	30600	25070	12260	16840	477	637	154	246	3100
1998-99	32440	25970	8800	14310	525	700	185	320	2700
1999-00	32440	25370	7850	10850	525	700	185	320	2135
2000-01	32440	27390	6970	10850	525	700	185	320	1628
2001-02	32900	26890	7670	13960	525	700	185	320	1825
2002-03	32900	26890	7670	13960	525	700	185	320	1850
2003-04	32900	26890	7670	13960	525	700	185	320	1850
2004-05	35387	24942	6659	12290	635	850	265	405	1880
2005-06	37250	26255	7010	12290	667	893	278	425	2870
2006-07	38138	29289	16968	16968	667	893	278	425	1900
2007-08	38138	29289	16968	16968	667	893	278	425	1900
2008-09	47000	32218	13600	16800	967	1295	360	616	2000
2009-10	48570	39241	13956	16800	967	1295	360	616	5210

Source: Forest Working Division Dharamshala.

The Forest Department sells standing trees to the local right as well as non-right holders at market rates. These rate since 1990-91 is tabulated in Table 1.3.17.

**Table: 1.3.17. Market rates of Standing Trees in Rs. Per Cum.**

Year.	Deodar.	Kail.	Fir / spruce	Chil.
1	2	3	4	5
1990-91	4814/-	3662/-	1719/-	2111/-
1991-92	6403/-	5676/-	2407/-	2782/-
1992-93	7890/-	7000/-	3365/-	2875/-
1993-94	7890/-	7000/-	3365/-	2875/-
1994-95	8679/-	7700/-	3701/-	3162/-
1995-96	9548/-	8470/-	4071/-	3479/-
1996-97	10503/-	9317/-	4478/-	3827/-
1997-98	11503/-	10249/-	4926/-	4210/-
1998-99	12708/-	11274/-	5419/-	4631/-
1999-2000	13413/-	11900/-	5720/-	4900/-
2000-01	16914/-	15005/-	6162/-	7213/-
2001-02	18605/-	16505/-	6778/-	7934/-
2002-03	20465/-	18155/-	7456/-	8727/-
2003-04	22512/-	19971/-	8202/-	9600/-
2004-05	24762/-	21969/-	10561/-	9023/-
2005-06	27238/-	24166/-	11617/-	9925/-
2006-07	29962/-	26582/-	12772/-	10918/-
2007-08	33389/-	32232/-	13200/-	10600/-
2008-09	38614/-	38044/-	17271/-	15372/-
2009-10	44031/-	38044/-	17271/-	15372/-

Source: Palampur Forest Division.

Similarly these rates for broad-leaved species diameter class wise and utility class wise are given as under in Table 1.3.18.

**Table: 1.3.18. Market Rates of Broad-Leaved Species in Rs. Per Tree**

Species	Rates Per Tree								
Year 1990-91	V	IV	III	IIA	IIB	IA	IB	IC	ID
1	2	3	4	5	6	7	8	9	10
Shisham.	406	1177	2671	5663	9694	14675	20427	20428	20428
Eucalyptus	54	192	415	894	1531	2318	3232	3232	3232
Khair.	361	725	1468	2887	4412	4795	5069	5362	5578
Utility Class I.	77	378	978	2101	3191	4136	4846	5557	6108
Utility Class II.	67	236	580	1224	1933	2659	3419	3869	4204
Utility Class III.	25	70	162	330	530	764	1060	1144	1200
Shisham.	487	1412	3205	6796	11633	17610	24514	24514	24514
Eucalyptus.	65	230	498	1073	1837	2782	3878	3878	3878
Khair.	433	870	1762	3464	5294	5754	6083	6434	6694
Utility Class I.	92	454	1174	2521	3829	4963	5815	6668	7330
Utility Class II.	80	283	696	1469	2320	3191	4103	4642	5045
Utility Class III.	30	84	194	396	636	917	1272	1373	1440
<b>1992-93 to 1998-99.</b>									
Shisham.	487	1412	3205	6796	11633	17610	24514	24514	24514
Eucalyptus	78	276	598	1288	2204	3338	4654	4654	4654



Khair.	520	1044	2114	4157	6353	6905	7300	7721	8033
Utility Class I.	110	545	1409	3025	4595	5956	6978	8002	8706
Utility class II.	96	340	835	1763	2784	3829	4924	5570	6054
Utility Class III.	36	101	233	475	763	1100	1526	1648	1728
1999-2000.									
Shisham.	3839/- per cub. meter.								
Eucalyptus	2890/- per cub. meter.								
Khair.	1158/- per M.G.								
Utility Class I.	187	927	2746	5895	8955	11687	11862	13684	14553
Utility class II.	187	663	1627	3416	5445	7462	9536	10255	11758
Utility Class III.	70	197	454	811	1486	2144	2374	3212	3368
2000-01									
Shisham.	5621/- per cub. meter.								
Eucalyptus	3060/- per cub. meter.								
Khair.	1114	2237	4529	8909	12390	13455	14226	15045	15654
Utility Class I.	603	2513	5926	12549	21892	25866	43032	52778	66775
Utility class II.	208	728	1791	3779	5968	8208	10555	11941	12978
Utility Class III.	77	216	498	1015	1635	2357	3271	3531	3704
2001-02									
Shisham.	6183/- per cub. meter.								
Eucalyptus	3366/- per cub. meter.								
Khair.	1225	2461	4982	9800	14980	16280	17214	18204	18941
Utility Class I.	663	2764	6519	13804	24081	28453	47335	58056	73452
Utility class II.	229	801	1970	4157	6565	9029	11611	13135	14276
Utility Class III.	85	238	548	1116	1798	2593	3598	3884	4074
2002-03									
Shisham.	6801/- per cub. meter.								
Eucalyptus	3703/- per cub. meter.								
Khair.	1347	2707	5480	10780	16478	17908	18935	20024	20835
Utility Class I.	729	3040	7171	15184	26489	31298	52068	63862	80797
Utility class II.	252	881	2167	4573	7221	9932	12772	14448	15704
Utility Class III.	93	262	603	1228	1978	2852	3958	4272	4481
2003-04									
Shisham.	7481/- per cub. meter.								
Eucalyptus	4073/- per cub. meter.								
Khair.	1482	2978	6028	11858	18126	19699	20823	22026	22919
Utility Class I.	802	3344	7888	16702	29138	34428	57275	70248	88877
Utility class II.	277	969	2384	5030	7943	10925	14049	15893	17274
Utility Class III.	102	288	663	1351	2176	3137	4354	4699	4929
2004-05									
Shisham.	8229/- per cub. meter.								
Eucalyptus	4480/- per cub. meter.								
Khair.	1630	3276	6630	13043	19938	21668	22905	24228	25210
Other B/L	3200/- per cub. meter								
2005-06									
Ban	18000/- per cub. meter								
Shisham	10100/- per cub. meter.								
B/L	3200/- per cub. meter.								
2006-07									
Ban	18000/- per cub. meter								
Shisham	11110/- per cub. meter.								
B/L	3520/- per cub. meter.								
2007-08									
Ban	18000/- per cub. meter								
Shisham	14492/- per cub. meter.								
Eucalyptus	5481/- per cub. meter.								
Poplar	5540/- per cub. meter								
Khair	22771/- per cub. meter								
2008-09									
Ban	18000/- per cub. meter								
Shisham	17993/- per cub. meter.								

Eucalyptus	5481/- per cub. meter.
Poplar	8907/- per cub. meter
Khair	22771/- per cub. meter
<b>2009-10</b>	
Ban	18000/- per cub. meter
Shisham	216633/- per cub. meter.
Eucalyptus	6076/- per cub. meter.
Poplar	8907/- per cub. meter
Khair	26557/- per cub. meter

Source: Palampur Forest Division.

**1.3.10. ROYALTY RATES:** - Royalty rates are fixed by the “**Pricing Committee**” species wise for each Forest Division. The Table 1.3.19 shows the royalty rates charged during 1991-91 to 2010-11 by the Forest Department from H.P.S.F.C. Ltd. for different species, coppice coupes and resin blazes.

**Table: 1.3.19. Royalty Rates per Cum. Standing Volume and per Resin blaze (Rs.)**

Year.	Species.					Resin.
	Chil	Deodar	Kail	Fir/ Spruce	Coppice / ha.	
1	2	3	4	5	6	7
1991-92	1417.65	3328.15	3023.20	1257.50	6018.75	19.00
1992-93	1417.65	3328.15	3023.20	1106.60	6018.75	24.00
1993-94	1418.00	3461.00	3144.00	1173.00	6018.75	27.00
1994-95	1475.00	3807.00	3427.00	1196.00	6018.75	24.00
1995-96	1549.00	4073.00	3667.00	1232.00	6018.75	27.00
1996-97	1704.00	4480.00	4034.00	1355.00	6379.15	31.00
1997-98	1704.00	4928.00	4437.00	1491.00	6379.15	33.00
1998-99	2556.00	6899.00	5990.00	1938.00	6379.15	26.00
1999-00	2040.00	7037.00	6230.00	1938.00	6379.15	26.00
2000-01	2040.00	7180.00	7170.00	1800.00	6379.15	25.00
2001-02	480.00	3890.00	2040.00	720.00	6379.15	27.00
2002-03	400.00	3950.00	2430.00	770.00	6379.15	25.00
2003-04	482.00	2879.00	1929.00	567.00	6379.15	23.20
2004-05	450.00	3620.00	2380.00	720.00	6379.15	30.00
2005-06	599.00	2775.00	2301.00	585.00	6379.15	30.00
2006-07	484.00	4146.00	2817.00	835.00	6379.15	23.00
2007-08	431.00	4315.00	2388.00	677.00	6379.15	33.00
2008-09	431.00	4315.00	2388.00	677.00	6379.15	33.70
2009-10	626.00	5664.00	2944.00	836.00	6379.15	35.00
2010-11	626.00	5664.00	2944.00	836.00	6379.15	35.00

Source: - Palampur Forest Division.

**1.3.11. PAST OUT-TURNS:** - The past out-turn of resin, timber and coppice coupes are given as under:

**1.3.11.1. RESIN:** - Table 1.3.20 gives out-turn of resin per thousand blazes since the creation of this division.

**Table: 1.3.20. Out-turn of Resin per thousand blazes**

Year	Total no. of blazes	Resin extracted (Qtls)	Resin yields per section (Qtls)
1	2	3	4
1979	89,970	3,098.38	34.43
1980	76,777	2,783.00	36.24
1981	74,453	2,557.81	34.34
1982	72,288	2,283.47	31.58
1983	59,142	1,753.23	29.64
1984	43,404	1,833.33	42.23
1985	43,533	1,697.09	38.98
1986	38,093	1,183.32	31.06
1987	41,909	987.84	23.57
1988	51,480	1,963.44	38.13
1989	57,072	2,567.52	44.98
1990	63,617	3,093.84	48.63
1991	63,101	3,209.54	50.86
1992	83,030	3,570.29	43.00
1993	86,992	3,750.30	43.11
1994	81,948	3,454.38	42.15
1995	48,919	1,871.81	38.26
1996	38,169	1,402.33	36.74
1997	31,404	900.32	28.67
1998	27,994	770.78	27.53
1999	21,269	693.09	32.05
2000	17,423	610.47	35.04
2001	57570	2187.66	38.00
2002	42549	875.00	20.56
2003	67641	2167.60	32.04
2004	75772	2881.82	38.03
2005	78074	2783.56	35.65
2006	86706	3451.51	39.80
2007	84175	33012.23	39.20
2008	81795	3032.31	37.07
2009	85837	3034.72	35.35
2010	82778	3211.12	38.79

Source: - Palampur Forest division.

**1.3.11.2. COPPICE COUPES:** - The out-turn from coppice coupes varies widely from forest to forest, depending upon the density and composition of stocking. The out turn of coppice coupes worked during the plan period is as under in Table: 1.3.21. The average out-turns from the coppice coupes in this division on the basis of coupes marked are about 89.00 cum./ha.

**Table: 1.3.21. Out-turn of coppice Coupes.**

Year.	Area of coppice coupes	Quantity extracted	
		Fuel wood (cum.)	Charcoal (Qtls.)
1	2	3	4
1984-85	22.54	3191.00	201.93
1985-86	29.34	3218.93	-
1986-87	8.09	1274.00	-
1987-88	9.71	480.00	-

Source: - Forest Working Division Dharamshala.

**1.3.11.3.TIMBER:** - Now with the improvement in the methods of logging, means of communications, transportation and efficient utilization pattern of all types of wood, the out-turn percentage of timber has increased considerably. Non-standard sizes, axhewn, round ballies, dimdimas, hakries etc. of all species and pulpwood, fuel wood / charcoals of chil are being extracted. In view of this, the out-turn percentage of various species as adopted in Forest Corporation for Palampur Forest Division is as under in Table: 1.3.22:

**Table: 1.3.22. Conversion Percentage of Timber, Pulpwood and Charcoal.**

Species	Sawn	Axed	Hakries	Pulp / Fuel wood	Charcoal	Total
1	2	3	4	5	6	7
<b>Kail.</b>						
Green.	40	12	8	-	-	60
Salvage.	35	12	8	-	-	50
<b>Fir/spruce</b>						
Green.	30	5	15	-	-	50
Salvage.	25	5	15	-	-	45
<b>Chil.</b>						
Green.	30	10	-	12	35	87
Salvage.	27	8	-	12	35	82

Source: -- Forest Working Division Dharamshala.

**1.3.12. PAST REVENUE AND EXPENDITURE:** - The figures of past revenue and expenditure since the creation of the division are tabulated in Table: 1.3.23:

**Table: 1.3.23 Revenue and Expenditure.**

Year	Rev. (Rs.)	Expenditure (Rs.)				(+) or (-)
		Non-Plan	Plan	Capital	Total.	
1	2	3	4	5	6	7
1978-79	1,71,291	3,55,119	1,88,891	1,20,665	6,64,675	(-) 4,93,384*
1979-80	12,98,026	12,33,516	32,10,076	3,54,761	47,98,353	(-) 35,00,327
1980-81	17,96,504	13,88,130	29,40,730	50,000	43,78,860	(-) 25,82,356
1981-82	19,28,386	14,42,714	41,53,666	-	55,96,380	(-) 36,76,994
1982-83	28,82,164	14,80,975	52,55,980	1,08,100	68,45,055	(-) 39,62,891
1983-84	24,77,647	16,89,395	53,80,788	-	70,70,183	(-) 45,92,536

1984-85	20,64,787	19,93,922	78,72,861	-	98,66,983	(-) 78,01,996
1985-86	25,98,713	21,76,694	82,40,790	1,00,000	1,05,17,484	(-) 79,18,770
1986-87	Data N.A.					
1987-88	7,09,328	42,11,950	97,80,175	4,78,000	1,44,70,125	(-) 1,37,60,797
1988-89	8,55,825	45,86,150	1,05,03,000	3,54,500	1,54,43,650	(-) 1,45,87,824
1989-90	5,92,427	47,14,800	76,60,700	4,00,900	1,27,76,400	(-) 1,21,83,972
1990-91	3,08,932	50,73,500	80,69,100	2,27,500	1,33,70,100	(-) 1,30,61,168
1991-92	2,00,428	51,73,700	1,37,35,400	3,77,100	1,92,86,200	(-) 1,90,85,772
1992-93	1,64,427	53,600	1,97,05,800	15,68,700	2,13,28,100	(-) 2,11,63,673**
1993-94	4,31,349	60,46,890	1,73,12,370	4,84,500	2,38,43,760	(-) 2,34,12,411
1994-95	3,96,501	71,09,250	2,29,51,200	30,23,600	3,30,84,050	(-) 3,26,87,549
1995-96	5,66,738	72,35,400	2,13,67,500	16,18,000	3,02,20,900	(-) 2,96,54,162
1996-97	5,32,511	94,58,650	2,87,98,425	25,10,100	4,07,67,235	(-) 4,02,34,724
1997-98	5,90,108	1,13,85,300	2,90,60,250	21,77,800	4,26,23,350	(-) 4,20,33,242
1998-99	7,63,227	1,23,32,500	3,69,68,000	20,53,000	5,13,53,500	(-) 5,05,90,273
1999-00	6,80,695	1,12,40,100	3,79,91,820	32,19,400	5,24,51,320	(-) 5,17,70,625
2000-01	15,58,056	1,25,97,079	3,12,91,990	2,02,100	4,40,91,169	(-) 4,25,33,113
2001-02	22,86,117	1,28,56,501	2,87,16,833	3,00,000	4,18,73,334	(-) 3,95,87,217
2002-03	15,11,336	1,18,91,649	2,32,00,424	6,42,000	3,57,34,073	(-) 3,42,22,737
2003-04	12,78,992	2,13,87,069	1,57,65,459	6,15,000	3,77,67,528	(-) 3,64,88,536
2004-05	7,82,222	2,22,57,274	21,47,000	3,00,000	2,47,04,274	(-) 2,39,22,052
2005-06	2,47,48,596	2,32,83,772	2,04,00,649	6,96,000	4,43,80,421	(-) 1,96,31,825
2006-07	61,06,739	2,66,72,041	1,12,53,865	2,45,000	3,81,70,906	(-) 3,20,64,167
2007-08	15,20,553	2,83,34,907	8,39,03,10	6,61,800	3,73,87,017	(-) 3,58,66,464
2008-09	35,28,064	39,68,218	79,97,785	13,50,000	1,33,16,003	(-) 97,87,939
2009-10	24,91,209	3,97,34,280	83,03,870	20,83,000	5,01,21,150	(-) 4,76,29,941

Source: - Palampur Forest Division.

\* These figures are w.e.f. 10/78 to 3/79 i.e. creation of Palampur Forest Division.

\*\* These figures are for Social Forestry Division Palampur.

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## CHAPTER-IV

### ACTIVITIES OF FOREST DEVELOPMENT CORPORATION LTD.

**1.4.1 GENERAL:** - H.P. State Forest Corporation Limited an undertaking of the HP Government came into existence on the 25th of March 1974. This Corporation deals with the marketing of mainly Timber, fuelwood, pulpwood, bamboos, khair, rosin, turpentine oil and subsidiary products (viz., phenyl, varnish, black Japan). In addition, a Fibre Board Factory at Baijnath in the jurisdiction of Palampur Forest Division is presently engaged in the joinery works, timber chemical treatment and timber seasoning for Government as well as private timber. The Corporation has been mainly created with the following objectives:

timber extraction and resin tapping

- (i) To carry out the extraction of timber and resin on scientific lines by adopting suitable modern techniques.
- (ii) To eliminate the Contractor's agency in respect of works of H.P. S.F.D.C. Ltd.
- (iii) To obviate the chances of illicit felling of trees, illicit tapping of resin and other malpractices.
- (iv) To work the forests on commercial lines by recycling of funds for works and also by raising funds from financial institutions as per requirements.

The Corporation has a long experience of timber harvesting and extraction operations, marketing and is in a position to provide expertise for the purpose. Since the entire resin tapping work is being done by the Corporation, it has developed Modern techniques for resin tapping and expertise in this respect is available for training as well as execution of works

**1.4.2. HARVESTING/EXPLOITATION OF TIMBER:** -Due to nationalization of forest exploitation and ban on green felling imposed by HP Government, only dry and fallen trees referred to as salvage are handed over to Divisional Manager, HPSFDC Ltd. Dharamshala for harvesting/ exploitation who has jurisdiction over this division. Chil is the only timber, which is regularly exported from this division. The main timber market is at Pathankot. The timber is sold by open auction at H.P. State Forest Development Corporation depots at Bhadroya and Nurpur and subsequently exported out of the state. Generally speaking, chil timber of this area is not of good quality and is, therefore, not popular in the trade. Timbers of miscellaneous broad-leaved species like mango, mulberry, shisham, semal, siris etc. is consumed locally for construction and agricultural implements etc. The position of trees handed-over to Divisional manager Dharamshala for the last ten years is given in Table 1.4.1.

**Table: 1. 4.1 Salvage Removals since 2000-01 from Palampur Forest Division**

Year	Nature of Marking	Chil	Deodar	Shusham	OBL	Total	Vol. in Cum	Royalty in Rs.
2000-01	Salvage	2254	0	0	10	2264	3660.778	28,78,364/-
2001-02	Salvage	3221	0	0	7	3228	5958.001	24,24,490/-
2002-03	Salvage	2133	8	0	51	2192	2195.260	12,99,874/-
2003-04	Salvage	2287	0	0	100	2387	3324.729	12,51,578/-
2004-05	Salvage	2626	144	0	0	2770	2723.150	11,87,788/-
2005-06	Salvage	3404	11	2	104	3521	4243.126	24,33,408/-
2006-07	Salvage	4094	0	0	139	4233	3251.423	15,24,340/-
2007-08	Salvage	4008	0	0	0	4008	4224.710	18,18,109/-
2008-09	Salvage	4857	0	0	619	5476	5006.548	21,47,007/-
2009-10	Salvage	5819	0	2	139	5960	5291.642	22,72,879/-

Source: Palampur Forest Division.

The HPSFC gets the exploitation work executed through contactors called Labour Supply Mates (LSMs). The employment to skilled, semi-skilled and general is provided almost throughout the year except in winter months. On an average 2.7 man days per cum of standing volume handed over to forest corporation are generated. If the total standing volume in a year varies from 3000 to 5000 cum then the total mandays generated would be 8000 to 13500. The timber harvested /exploited from this division is sold in an open auction as HP Sale Depots at Nurpur and Bhadroya (near Pathankot).

**1.4.3.FUELWOOD AND CHARCOAL:** - The coppice coupes composed of misc. scrub species are the main source of fuel wood and charcoal, which are mainly consumed locally in various towns viz. Palampur, Baiinath, Paprola, Thural, Dheera, Khaira and Droh etc. Such forests are mainly located in lower areas of Palampur and Droh ranges. During the previous working plan period from 1984-85 to 1987-88 six coppice coupes covering an area of 69.68 hac. has been exploited in this division. Chil charcoal is also converted from the unfit trees and lops and tops which finds its market in activated carbon factories at Hoshiarpur and Amritsar, and with goldsmiths. However, fuel wood and charcoal is deficient in this division and demand is met with by imports from other divisions. Quantity of fuel wood and charcoal sold from the retail sale depots of State Forest Corporation during the last five years is tabulated as under in Table 1.4.2

**Table 4.2. Quantity of Fuel wood and Charcoal sold.**

Year.	Depot wise Quantity sold in Qtls.			
	Palampur.		Bajjnath.	
	Fuel wood.	Charcoal.	Fuel wood	Charcoal.
1	2	3	4	5
1995-96	852.65	1.25	670.60	45.10
1996-97	1059.97	61.96	476.69	108.95
1997-98	877.19	11.37	504.69	12.82
1998-99	414.84	87.64	159.17	43.03
1999-2000	228.13	205.74	193.42	35.65
2000-01	852.65	35.00	180.60	35.00
2001-02	420.22	88.08	65.21	31.80
2002-03	148.48	98.80	150.00	30.60
2003-04	124.94	39.47	70.65	35.30
2004-05	23.25	0.20	49.23	3.66
2005-06	13.35	7.98	31.15	20.68
2006-07	5.30	5.50	35.10	9.61
2007-08	17.50	0.00	39.50	13.82
2008-09	33.70	37.00	0.00	11.02
2009-10	20.81	3.11	152.95	15.56

Source: - Forest Working Division Dharamshala

**1.4.4. PULPWOOD:** - Chil pulpwood from the small wood up to a minimum diameter of 10 cm. Under bark has also been started to be converted, and is purchased by paper and pulp mills located at Yamuna Nagar and Saharanpur, and as packing case material.

**1.4.5. RESIN TAPPING AND PROCESSING** - Resin is chief forest produce of this area and main source of revenue. Since 1.4.1975 the tapping operations are being done by the H.P. State Forest Corporation (Govt. **Notification No. 10-26/72 SF dated 30.5.1975**). All the workable chil forests are being tapped for resin. With the coming into force of **H.P. Resin Products (Regulation of Trade) Act, 1982** the resin from private forests is now being purchased by the Forest Corporation at the rates purposed by the Advisory Committee constituted under the Act and approved by the Govt. from time to time. It is a metabolic exudes being tapped from *Pinus roxburghii* commonly known as Chil. In fact, it is the most important source of revenue to the Government and also the local people owning chil trees. The Corporation has fully trained staff for this work and expertise in this respect is available for the purpose of resin processing and transportation. The large numbers of local people find employment in its extraction and carriage. Resin extracted from this Division is supplied to Corporation Factories at Bilaspur and Nahan.

**1.4.6. TECHNIQUE:** - Prior to 1984, the resin tapping was done by conventional French cup and lip method. This method involved deep and rather uncontrolled depth of blaze, coupled with frequent fires and high velocity wind was responsible for heavy salvage removals. Improved "German Rill Method" of resin tapping and tapping since 1988 is being done only through this method gradually



replaced the conventional. This method has been enunciated in field guide to modern methods of resin tapping by Sh. V.P. Verma, I.F.S. published by Forest Research Institute and Colleges, Dehradun. A detailed guideline manual about this method has also been published by Directorate (North) of the H.P. State Forest Corporation Ltd. Recently "Bore Hole Method" of resin tapping has been introduced at the trial stage in H.P. Its quantitative and qualitative results in H.P. are yet to be analysed.

**1.4.7. TAPPABLE DIAMETER:** - Tappable diameter for rill method is fixed as 35 cm. This however is on the lower side resulting in to large scale drying of chil trees. It is recommended that tappable diameter should be increased to 40 cm. Trees to be tapped are enumerated, punch marked and grouped in to sections of 1000 blazes each after every five years. This work of enumeration is to be completed during winter.

**1.4.8. CROP SETTING:** - crop setting must be started by 15<sup>th</sup> of Feb. and completed 15<sup>th</sup> March. It is important that the crop setting is completed in time so that tapping season is not delayed. The tree to be tapped should be cleared of inflammable material over a radius of 1m.

**1.4.9. BARK SHAVING:** - With the help of Bark Shaver the loose bark over a surface area of 45 cm. in length and 30 cm. in width is removed leaving a space of about 15cm. from the ground level. The bark left should not be more than 2 mm. in thickness to facilitate freshening.

**1.4.10. MARKING OF BLAZE AND GROOVE:** - Blaze frame is put in vertical position on the debarked area and outer boundaries of the blaze marked with black Japan so that lowest point is 15 cm. from the ground level. Position of blaze and central groove are marked with the help of wooden board and marking gauge.

**1.4.11. CENTRAL GROOVE CUTTING:** - Central groove cut by drawing the groove cutter from above downwards. Since in the first year the blaze is just 15 cm. from the ground level the groove cutter is moved upwards.

**1.4.12. FIXING THE LIP:** - The lip is fixed with the help of two horseshoe nails so that it makes an angle of 45 degree with the tree. A 5-cm. long wire nail is driven in to the tree about 2 cm. below the mid point of the lip hanging the collection pot on it. The nail is driven at an angle so that the pot hangs snugly against the tree. It is suggested that instead of wire nails, bamboo nails should be used for hanging the pot with the tree. During fire in the forest these wooden nails will get burnt and the pot will be dislodged quickly from the tree. The iron nails hold the pot fast to the tree and the burning resin in the pot act like a blowlamp.

**1.4.13. FRESHNING:** - First rill should be drawn by moving the freshening knife from the lowest point of the central groove upwards along the blaze boundary in a way that the rill makes an angle of 40 degree with the central groove. The

process is repeated on the other side of the central groove. For the second and subsequent freshening which are repeated approximately at weekly intervals, the guide of the freshening knife should move touching the upper side of previous rill. The rills should be parallel to each other with an uncut bark (inter rill bark) of 5 mm. in between two successive rills. The width of the rill is 6-7 mm. and depth 2 mm. (excluding 2 mm. depth of unshaved bark). The lengths of the rill should neither nor fall short of the blaze limit. One freshening is given almost every week and the blaze thus attains a height (length) of 36-38 cm. in one season. The tapping season is from 15<sup>th</sup> March to 15<sup>th</sup> November i.e. 8 months. The freshening is given 4 times in a month and thus the total number of rills is to be limited to 32 in a season. The width of the blaze is 20cm i.e. 10 cm on either side of the central groove.

**1.4.14. APPLICATION OF STIMULANT:** - The stimulant is nothing but a 20% solution of the mixture of sulphuric and nitric acids mixed in equal proportion w/w. It should be sprayed on the freshly cut rills by squeezing the plastic bottle and moving its nozzle in a steady motion along the rill. For obtaining good spray the plastic bottle should be held at 45-degree angle to the tree and its nozzle 3-5 cm. away from it. Precaution should be taken to remove the pot till the extra acid has run down the lip. The tendency to apply acid more frequently and in higher concentration to obtain higher yield should be curbed.

**1.4.15. COLLECTION OF RESIN AND CLEANING OF GROOVE:** - Resin is collected into collection Can (Balti) by removing pot from the tree. The resin adhering to the pot is removed with the help of scraper. Central groove is also cleaned after each collection with groove cleaner to avoid accumulation of resin in it. For improving labour output, collection of resin from the pots should be done with alternate freshening in March, April and August to October. However, from May to July, collection may be done with each freshening.

**1.4.16. REMOVAL OF LIPS AND POTS:** - At the end of the tapping season, the nails should be pulled out and lips removed.

**1.4.17. INSTALLATION IN SUBSEQUENT YEARS:** - In 2<sup>ND</sup> year, the position of the blaze is marked above the top of the first year blaze and other operations of the first year remain the same and repeated. After tapping for two years the blaze reaches a height at which it is not possible to pull the freshening knife upwards. Hence during 3<sup>rd</sup> year freshening is given by pushing the freshening knife upwards from the central groove towards the outer edge of the blaze. Like this blaze is extended upwards for four years. During 5<sup>th</sup> year a new blaze is made at the bottom leaving 7.5cm. wide space from the outer edge of the first year blaze.

**1.4.18. USE OF GUIDE:** - The use of guide with the freshening knife by the tapper is compulsory.

**1.4.19. TAPPING SEASON:** - Tapping season extends from 15<sup>th</sup> March to 15<sup>th</sup> November. Freshening is not made from 16<sup>th</sup> November to 30<sup>th</sup> November, and during this period resin is scraped (raghod).

**1.4.20. RESIN DEPOTS:** - The resin collected from the forests is brought to the resin depot at roadsides closed to the tapped areas. A number of sections are attached to each depot under the charge of a Resin Watcher who maintains the accounts of the depot and supervises the works of labour in the forests.

**1.4.21. PAST YIELD:** - The detail of the blazes tapped and the yield obtained during past 21 years is tabulated in Table: 1.4.3.

**Table: 1.4.3. Out-turn of Resin per thousand blazes.**

<b>Year.</b>	<b>Total no. of blazes.</b>	<b>Resin extracted (Qtls).</b>	<b>Resin yields per section (Qtls).</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1979	89,970	3,098.38	34.43
1980	76,777	2,783.00	36.24
1981	74,453	2,557.81	34.34
1982	72,288	2,283.47	31.58
1983	59,142	1,753.23	29.64
1984	43,404	1,833.33	42.23
1985	43,533	1,697.09	38.98
1986	38,093	1,183.32	31.06
1987	41,909	987.84	23.57
1988	51,480	1,963.44	38.13
1989	57,072	2,567.52	44.98
1990	63,617	3,093.84	48.63
1991	63,101	3,209.54	50.86
1992	83,030	3,570.29	43.00
1993	86,992	3,750.30	43.11
1994	81,948	3,454.38	42.15
1995	48,919	1,871.81	38.26
1996	38,169	1,402.33	36.74
1997	31,404	900.32	28.67
1998	27,994	770.78	27.53
1999	21,269	693.09	32.05
2000	17,423	610.47	35.04
2001	57750	2137.66	38.00
2002	42549	875.00	20.56
2003	67641	2167.60	32.04
2004	75772	2881.82	38.03
2005	78074	2783.56	35.65
2006	86706	3451.51	39.80
2007	84175	3299.66	39.20
2008	81795	3032.31	37.07
2009	85837	3034.72	35.35
2010	82778	3211.12	38.79

Source: Palampur Forest Division.

**1.4.22. AREAS AVAILABLE FOR RESIN TAPPING:** - All the felled P.B.I and P.B.IV areas of Chil Working Circle are kept out of the purview of resin tapping. Only P.B.II and P.B. III areas of chil working circle are prescribed for resin tapping. The chil trees found in other working circles are banned for resin tapping on account of poor growth, density and limited extent. The Divisional Forest Officer may stop resin tapping in any forest where it is felt that the resin extraction work is likely to interfere with the growth of the trees. Only Rill Method shall be used to carry out resin tapping. It is estimated that about 50,000 blazes will be available for resin tapping annually.

**1.4.23. SUSPENDING RESIN TAPPING OPERATIONS:** - In case, drying up of trees due to resin tapping is observed in some forests it should be closed immediately for tapping for a minimum period of three years. Re-tapping in these forests should be taken up only after the reasons for drying up of the trees are analysed and effective steps taken to prevent recurrence.

**1.4.24. FIRE PROTECTION:** - All needles and other refuse within 1 m. radius of the trees tapped for resin should be removed and other instructions laid down in the H.P. Forest Manual Vol. IV and other latest instructions must be observed carefully. It is better if bushes with in 2 m. of these trees are cut. Areas being tapped for resin are very susceptible to fire and need intensive fire protection. Some sort of fire fighting equipment should be provided in all resin depots to meet an emergency. All staff put on resin work should be taught the use of this equipment.

**1.4.25. RESIN FROM PRIVATE FORESTS:** - With the nationalization of resin trade under "The Resin and Resin Products (Trade) Act, 1981," the resin from the private ownership is also purchased by the H.P. State Forest Corporation Ltd. The data on quantity of resin extracted from private forests for the year 1993 to 2001 available from the Divisional records is produced in Table: 1.4.4.

**Table: 1.4.4. Number of Private Blazes and Resin Extracted.**

Year	No. of Blazes.	Quantity (qtls.)
1	2	3
1993	1,13,294	3,850
1994	1,04,466	3,760
1995	83,882	3,200
1996	82,615	2,905
1997	85,098	2,890
1998	83,185	2,739
1999	55,586	1,800
2000	55,469	1,850
2001	57,570	1,900
2002	42549	875.00
2003	67641	2167.60
2004	75772	2881.82
2005	78074	2783.56
2006	86706	3451.51
2007	84175	33012.23
2008	81795	3032.31
2009	85837	3034.72
2010	82778	3211.12

Source: Palampur Forest Division.

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## CHAPTER-V

### FIVE YEAR PLANS

**1.5.1. GENERAL:** In the past the forests of the division have been managed for getting sustainable yield through various Working Plans. The silvicultural fellings were mainly aimed at making the forest uniform and the regeneration achieved through natural means. Till the early seventies, the emphasis was on planting commercially important species such as deodar, kail, chil, etc. The increasing demands of forest produce in the state especially that of timber and fuel-wood resulted in focus on large scale plantations of commercially important species. Although the plantation programme started from Ist Five Year Plan but it gained momentum from IIIrd Plan onwards. The Plan wise management of forests and expenditure is as under:

**1.5.2. Ist FIVE YEAR PLAN (1951-56):-** During Ist Five Year Plan the forests of this division were managed under Romesh's revised working plan (1950-51 to 1981-82). The forests of the tract were exploited commercially to meet the timber and fuel-wood requirements. Chil Shelterwood, Oak Shelterwood, Coppice and Selection working circles were constituted and worked. The Protection and Plantation were created to improve the condition of the growing stock and meet local demand of fuel and fodder. The Chil Shelterwood and Oak Shelterwood working circles were managed under "Punjab Shelterwood System" with mainly artificial regeneration. However, in Coppice working circle the silvicultural system adopted was "Coppice with Standard" whereas in Plantation working circle "Clear Felling System" followed by plantation of chil was preferred. The combined figures of revenue and expenditure during Ist Five Plan of Palampur Forest Division are tabulated as under in Table 1.5.1:

**Table: 1.5.1: Revenue and Expenditure during Ist Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1951-52	NA	NA	NA
1952-53	NA	NA	NA
1953-54	14,43,169/-	8,25,377/-	(+) 6,17,792/-
1954-55	14,45,781/-	13,81,247/-	(+) 64,534/-
1955-56	16,18,286/-	9,41,048/-	(+) 6,77,238/-

Source: Kangra Working Plan by R. Malhotra.

**1.5.3. IInd FIVE YEAR PLAN (1956-61):-** During this period, the forests of this tract were managed under Romesh's revised working plan (1950-51 to 1981-82) as above. The combined figures of revenue and expenditure during IInd Five Plan of Palampur Forest Division are tabulated as under in Table: 1.5.2.

**Table: 1.7.2. Revenue and Expenditure during IInd Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1956-57	19,06,595/-	7,50,863/-	(+) 11,55,732/-
1957-58	17,61,602/-	9,39,261/-	(+) 8,22,341/-
1958-59	22,76,639/-	9,14,658/-	(+) 13,61,981/-
1959-60	10,38,125/-	10,16,877/-	(+) 21,618/-
1960-61	24,92,083/-	11,22,335/-	13,69,648/-

Source: Kangra Working Plan by R. Malhotra.

**1.5.4. IIIrd FIVE YEAR PLAN (1961-66):-** During this period, the forests of this tract were managed under under Romesh's revised working plan (1950-51 to 1981-82) as above. The combined figures of revenue and expenditure during IIIrd Five Plan of Palampur Forest Division are tabulated as under in Table: 1.5.3.

**Table: 1.5.3. Revenue and Expenditure during IIIrd Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1961-62	24,77,278/-	11,31,785/-	(+) 13,45,589/-
1962-63	13,69,115/-	11,94,761/-	1,74,836/-
1963-64	15,48,390/-	16,48,180/-	(-) 99,790/-
1964-65	18,40,642/-	21,48,956/-	(-) 3,08,314/-
1965-66	18,45,606/-	22,83,775/-	(-) 3,38,169/-

Source: Kangra Working Plan by R. Malhotra.

**1.5.5. IVth FIVE YEAR PLAN (1969-74):-** During this period, the forests of this tract were managed under under Romesh's revised working plan (1950-51 to 1981-82) as above. The combined figures of revenue and expenditure during IVth Five Plan of Palampur Forest Division are tabulated as under in Table: 1.5.4.

**Table: 1.5.4. Revenue and Expenditure during IVth Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1969-70	31,25,963/-	23,98,625/-	(+) 7,27,338/-
1970-71	16,69,550/-	39,62,357/-	(-) 22,92,807/-
1971-72	65,23,255/-	48,50,453/-	(+) 16,72,802/-
1972-73	NA	NA	NA
1973-74	NA	NA	NA

Source: Kangra Working Plan by R. Malhotra.

**1.5.6. Vth FIVE YEAR PLAN (1974-79):-** During this period, the forests of this tract were managed under under Romesh's revised working plan (1950-51 to 1981-82) as above. The figures of revenue and expenditure during Vth Five Plan of Palampur Forest Division are tabulated as under in Table: 1.5.5.

**Table: 1.5.5. Revenue and Expenditure during Vth Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1974-75	NA	NA	NA
1975-76	NA	NA	NA
1976-77	NA	NA	NA
1977-78	NA	NA	NA
1978-79	1,71,291/-	6,64,675/-	(-) 4,93,384/-

Source: Palampur Working Plan by RA Singh.

**1.5.7. Vith FIVE YEAR PLAN (1980-85):** - As above upto 1981 the forests of this tract were aneged under Romesh's Working Plan and from 1981-82 to 1995-96 these forests has been managed under under RA Singh's revised working plan. In RA Singh's working plan forests of this division were managed under Chil, Ban-oak, Alpine Pasture, Protection and Plantation working circles. The Chil Shelterwood and Oak Shelterwood working circles were managed under "Punjab Shelterwood System" with mainly artificial regeneration and in Plantation working circle "Modified Clear Felling System" followed by plantation of chil was preffered. However, due to ban on green felling only salvage removals has been done and no silvicultural felling carried out during this period. During this working plan with the launching of social forestry programme, the focus shifted towardsraising of fuel, fodder, smalltimber and grasses to meet the growing domestic needs of rural communities. The figures of revenue and expenditure during VIth Five Plan of Palampur Forest Division are tabulated as under in Table:1.5.6.

**Table: 1.5.6. Revenue and Expenditure during VIth Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1980-81	17,96,504/-	43,78,860/-	(-) 25,82,356/-
1981-82	19,28,386/-	55,96,380/-	(-) 36,76,994/-
1982-83	28,82,164/-	68,45,055/-	(-) 39,62,891/-
1983-84	24,77,647/-	70,70,183/-	(-) 45,92,536/-
1984-85	20,64,787/-	98,66,983/-	(-) 78,01,996/-

Source: Palampur Working Plan by RA Singh.

**1.5.8. VIIth FIVE YEAR PLAN (1985-90):** - During this period, the forests of this tract were managed under under RA Singh's revised working plan (1980-81 to 1995-96) as above. The social forestry works were in full swing, main emphasis being on raising fuel, fodder, small timber and grasses to meet the increasing domestic needs of rural communities. The figures of revenue and expenditure during VIIth Five Plan of Palampur Forest Division are tabulated as underin Table: 1.5.7.

**Table: 1.5.7. Revenue and Expenditure during VIIth Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1985-86	25,98,713/-	1,05,17,484/-	(-) 79,18,770/-
1986-87	NA	NA	NA
1987-88	7,09,3/-28	1,44,70,125/-	(-) 1,37,60,797/-
1988-89	8,55,82/-5	1,54,43,650/-	(-) 1,45,87,824/-
1989-90	5,92,427/-	1,27,76,400/-	(-) 1,21,83,972/-

Source: Palampur Working Plan by RA Singh.

**1.5.9. VIII FIVE YEAR PLAN (1992-97):** - During this period, the forests of this tract were managed under under RA Singh's revised working plan (1980-81 to 1995-96) as above The JFM approach also started in the division and the forestry activities were implemented under departmental schemes. Due to ban on green felling, the objective was afforesting denuded/degraded forests. The constitution of forest development committees and their participation in planning and implementation was sought. The figures of revenue and expenditure during VIIIth Five Plan of Palampur Forest Division are tabulated as under in Table: 1.5.8.

**Table: 1.5.8. Revenue and Expenditure during VIIIth Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1992-93	1,64,427/-	2,13,28,100/-	(-) 2,11,63,673/-
1993-94	4,31,349/-	2,38,43,760/-	(-) 2,34,12,411/-
1994-95	3,96,501/-	3,30,84,050/-	(-) 3,26,87,549/-
1995-96	5,66,738/-	3,02,20,900/-	(-) 2,96,54,162/-
1996-97	5,32,511/-	4,07,67,235/-	(-) 4,02,34,724/-

Source: Palampur Forest Division.

**1.5.10. IXth FIVE YEAR PLAN (1997-2002):**- The JFM activities continued in this period and Due to ban on green felling, the objective was mainly on afforesting denuded/degraded forests. The works of afforestation, soil conservation, entry point activity started by the VFDCs and microplan process learnt and executed. Sanjhi Van Yojna started on the principles of JFPM. Here again the focus remained on restocking/regeneration of degraded forests. The figures of revenue and expenditure during IXth Five Plan of Palampur Forest Division are tabulated as under in Table: 1.5.9.

**Table: 1.5.9. Revenue and Expenditure during IXth Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
1997-98	5,90,108/-	4,26,23,350/-	(-) 4,20,33,242/-
1998-99	7,63,227/-	5,13,53,500/-	(-) 5,05,90,273/-
1999-00	6,80,695/-	5,24,51,320/-	(-) 5,17,70,625/-
2000-01	15,58,056/-	4,40,91,169/-	(-) 4,25,33,113/-
2001-02	22,86,117/-	4,18,73,334/-	(-) 3,95,87,217/-

Source: Palampur Forest Division.



**1.5.11. Xth FIVE YEAR PLAN (2002-2007):** - Both the JFM programmes & SVY created mass awareness about forestry but the focus was again on raising plantations besides soil works and entry point activities. The CAT Plan of Om Power Project and other Compensatory Afforestation was also implemented with emphasis on soil, water conservation. Due to ban on green felling only salvage removals has been carried out with focus on planting open and denuded forests. The figures of revenue and expenditure during Xth Five Plan of Palampur Forest Division are tabulated as under in Table: 1.5.10

**Table: 1.5.10. Revenue and Expenditure during Xth Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
2002-03	15,11,336/-	3,57,34,073/-	(-) 3,42,22,737/-
2003-04	12,78,992/-	3,77,67,528/-	(-) 3,64,88,536/-
2004-05	7,82,222/-	2,47,04,274/-	(-) 2,39,22,052/-
2005-06	2,47,48,596/-	4,43,80,421/-	(-) 1,96,31,825/-
2006-07	61,06,739/-	3,81,70,906/-	(-) 3,20,64,167/-

Source: Palampur Forest Division.

**1.5.12. XIth FIVE YEAR PLAN (2007-2012):** - Both the JFM programmes & SVY created mass awareness about forestry but the focus again is on raising plantations/increasing forest cover besides soil works. The CAT Plan of Om Power Project and other Compensatory Afforestation are being implemented with emphasis on soil, water conservation. Due to ban on green felling only salvage removals has been carried out with focus on planting open and denuded forests. The figures of revenue and expenditure during XIth Five Plan upto 2009-10 of Palampur Forest Division are tabulated as under in Table: 1.5.11.

**Table: 1.5.11. Revenue and Expenditure during XIth Five Year Plan**

Year	Revenue in Rs.	Expenditure in Rs.	Surplus/Deficit in Rs. (+)/(-)
2007-08	15,20,553/-	3,73,87,017/-	(-) 3,58,66,464/-
2008-09	35,28,064/-	1,33,16,003/-	(-) 97,87,939/-
2009-10	24,91,209/-	5,01,21,150/-	(-) 4,76,29,941/-

Source: Palampur Forest Division.

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## CHAPTER – VI

### STAFF AND LABOUR SUPPLY

**1.6.1. STAFF:** - The sanctioned strength of Palampur Forest Division for various categories of staff as stood on 31.3.2010 is given in Table 1.6.1.

**Table: 1.6.1. Staff position of Palampur Forest Division as on 31.3.2010.**

Sr. No.	Category of post	Sanctioned strength		
		Plan	Non-Plan	Total
	<b>EXECUTIVE STAFF</b>			
1	Divisional Forest Officer.	-	1	1
2	Asstt. Conservator of Forests.	-	1	1
3	Forest Rangers.	-	6	6
4	Deputy Rangers.		19	19
5	Forest Guards.		82	82
	<b>MINISTERIAL STAFF AND OTHERS</b>			
6	Superintendent Grade II.	-	1	1
7	Senior Assistant.	-	3	3
8	Jr. Asstt. /Sr.Clerk/Clerks.	-	8	8
9	Driver.	-	1	1
10	Patwari.	-	1	1
11	Kanungo	-	1	1
12	Electrician-IV.	-	1	1
13	Peon.	-	6	6
14	Peon cum Khalasi	-	6	6
15	Peon cum Chowkidar.	-	1	1
16	Demarcation Daroga.	-	4	4
17	Malies.	-	5	5
18	Chowkidar.	-	9	9
19	Khalasi.	-	6	6
20	Forest Worker.	-	75	75
21	Sweeper.	-	1	1
	<b>Total.</b>		<b>129</b>	<b>129</b>

Source: - Palampur Forest Division.

The executive staff is adequate but ministerial staff is inadequate keeping in view the paper work involved at Divisional level. The devotion of staff to their duty

is not up to the mark as democratization of all institutions has led them to seek shelter from politicians rather than to depend on their own performance. The annual establishment charges on pay and allowances of executive, ministerial and other staffs posted in Palampur Division as on 31.3.2010 are given in Table 1.6.2.

**Table: 1.6.2. Annual establishment charges.**

<b>Sr. No.</b>	<b>Name of Head.</b>	<b>Amount in Rs.</b>
1	Salary	136251030
2	Travelling allowance.	400000
3	Medical allowance.	1245000
4	Liveries/uniform	36000
	<b>Total.</b>	<b>137932030</b>

Source: - Palampur Forest Division.

**1.6.2. EXECUTIVE CHARGES:** - There are three territorial Ranges viz. Baijnath, Droh, and Palampur with 9 Blocks and 46 Beats. Most of the area in the main valley is easily approachable and connected by road, thus, the present strength of executive staff is adequate for supervision, control, and execution of forestry works etc. However with the increasing emphasis on Joint Forest Management / FDA Projects and consequent increase in quantum of work of specialized nature, existing staff is required to be trained in these disciplines for proper and effective implementation of these schemes.

**1.6.3. RAKHAS:** - The Rakha or the Forest Watchman, an institution peculiar to Kangra District, deserves special mention. Rakhas were first appointed in 1853-54; their emoluments consisted of **(i)** a grain cess of two kg per house for each harvest and **(ii)** a share in the sale proceeds of trees accruing in all the Protected and Un-classed forests. In 1920 when the control of certain Un-delimited Protected and Un-classed forests passed to the Deputy Commissioner, the services of the concerned Rakhas were dispensed with and new incumbents on cash payment of Rs. 12/- per month, which was later on increased to Rs. 17/- per month, were employed. On the resumption of control of these forests by the Forest Department in 1924-25, these Rakhas were replaced by others, much larger in number, and were paid on the same old system. No Rakha, thus, receives any regular cash payment from the Govt. Rakha assist the Forest Guards in protection of forests and detection of forest offences and, thus, his role in the organization is quite significance; but the system of his remuneration is unsound and far from satisfactory. In the year 1937-38, the question of pay and emoluments of Rakhas came under the review of the Punjab Government Forest Commission, but the Government turned down the question of pay. For his emoluments, he has been left to the mercy of villagers whose offence, he is supposed to detect and report. There is wide spread dis-satisfaction about their wages. In the villages where the zamindari share in the sale proceed from the forests is considerable, the Rakha also gets good sum, but in cases where there have not been any sales from the forests the Rakhas have got nothing throughout their tenure. This system is highly discriminatory and has generated deep resentment among them. The system of

Rakha is not working properly and forest guard had become complacent. The forest guards looked forward to Rakhas for forming various duties of forest protection. Now, the system of payment of Haq-Chuharam to the Rakhas stand abolished w.e.f 1<sup>st</sup> April, 2010. The Rakhas stand relieved of their duties and other obligations attached to them.

**1.6.4. LABOUR SUPPLY:** - For most of the forest works, unskilled or semi-skilled labour is required. Adequate local labour is generally available for all forestry works in the main valley except during harvesting season. The labour semi-skilled and skilled, for timber extraction and resin collection works is now being arranged by the H.P. State Forest Development Corporation Ltd, as the resin tapping operations are being done by the H. P. State Forest Development Corporation Ltd since 1.4.75 (Govt. notification No. 10-26/72 SF dated 30.5.75). Resin collection has been in vogue in this tract for about 80-90 years and local labour, fully conversant with the technique, is readily available. The prevailing wages rates (2010-2011) for different types of labourers employed on cultural operations; roads and building works etc. are given in Table 1.6.3.

**Table: 1.6.3. Daily Labour Basic Rates**

Sr. No.	Category of Daily Labour.	Unit	Rate in Rs.
<b>1</b>	<b>UN-SKILLED LABOUR.</b>		
	Adult male or female.	Per day.	120.00
<b>2</b>	<b>A. SKILLED LABOUR.</b>		
	a) Quarry man (Khangir).	-do-	120.00
	b) Jumper man.	-do-	120.00
	c) Driller (for air compressor).	-do-	120.00
	d) Spray man.	-do-	120.00
	e) Carpenter Ist class.	-do-	192.00
	f) Carpenter IInd class.	-do-	164.00
	g) Mason Ist class.	-do-	192.00
	h) Mason IInd Class.	-do-	153.00
	i) Painter Ist class.	-do-	153.00
	j) Painter IInd class.	-do-	132.00
	k) Blacksmith.	-do-	153.00
	l) Plumber Ist class.	-do-	153.00
	m) Plumber IInd class.	-do-	153.00
	n) Bar binder.	-do-	153.00
	<b>B. MECHANICAL LABOUR.</b>		
	a) Saw mill operator.	-do-	153.00
	b) Asstt. Saw mill Operator.	-do-	120.00
	c) Cleaner.	-do-	120.00
	d) Electrician Ist Class (ITI qualified).	-do-	192.00

	e) Electrician IInd Class.	-do-	153.00
	<b>C. TIMBER EXTRACTION LABOUR.</b>		
	a) Feller (Girani).	-do-	120.00
	c) Logger.	-do-	120.00
	d) Sawyer (Chirani).	-do-	132.00
	c) Dresser (Pachani).	-do-	120.00
	e) Climber (Lopper).	-do-	120.00
<b>3.</b>	<b>MISCELLANEOUS LABOUR.</b>		
	a) Chowkidar (Office, Depot, Nursery, Plantation & Rest Houses), Khalasi, Syce, Bhisti, Zoo Animal Attendant, Fire Watcher, Grinder for chips flooring, Mate, Calliperman, Mali, Sweeper, Enumerator, Enclosure Sweeper, Charcoal burning labour.		
	b) Muleteer.	-do-	132.00

Source: - Palampur Forest Division.

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## **CHAPTER – VII**

### **PAST SYTEM OF MANAGEMENT**

**1.7.1. GENERAL HISTORY OF THE FORESTS:** - Before the tract was ceded to the British Government in 1846, the forests were the property of the local rulers and there were no definite rules for the management of these forests. With the advent of the British rule, the forest were placed under the control of the Deputy commissioner and were managed in accordance with the rules contained in the village administration papers of the land Revenue Settlement by Barnes (1849-52). Bailey modified these rules in 1853, which were subsequently replaced by the rules promulgated by the Government of India 1855 for the conservancy of forests in the hill tracts of Punjab.

In the year 1878, the first Indian Forest Act was introduced and regular forest settlement commenced in 1853. In 1894, the forests of this tract were placed under the charge of Forest Department. After coming in force of Anderson's Forest Settlement in 1897 and Gibson' Forest settlement (for Chhota and Bara-Banghal) in 1904, the first working plan was compiled by Hart (1903-04 to 1920).

In 1909 the Government of India drew attention of the local Government to the unsatisfactory condition of most of the Protected Forests, the ever-increasing demands of right-holders, the excessive sheep and goat grazing etc., and directed to take necessary measures to save the forest from permanent damage. This resulted in the imposition of a "Cattle. Tax", enhancement of gaddi grazing dues, a scheme of rotational closures of the forest authorities in the District. The delimited protected forests for which the rotational closure scheme had been prepared and the un delimited protected forests of Chhota and Bara-Banghal remained under the charge of the Forest Department, while the remaining forests were placed again under the control of the Deputy Commissioner who employed separate staff to protect and manage these forests. Walters (1920-21 to 1929-30) prepared a revised working plan for the forests under the charge of the Forest Department. In 1924, however, the Punjab Legislative Council refused to provide funds for the Deputy Commissioner's special forest establishment and the Forest Department resumed charge of these forests as well.

From 1931-32, the forests were managed under Mohan's Revised Working Plan up to 1951-52, which dealt only with the delimited protected, and some more important un classed forests. Mohan's plan was followed by Remote's Revised Working Plan (1951-52 to 1980-81), which also dealt only with the Delimited Protected and some un-classed forests of the main valley. A separate working plan for the delimited and Un Delimited Protected forests of Chhota Banghal was prepared by Romesh's (1951-52 to 1980-81). Some forests of the main valley were transferred to the Co-operative forest Societies for management during 1941 and separate working plans were prepared for the forests of each Society followed by an integrated working plan for all the Society forests of Kangra District by R.D.

Rawal 1968-69 to 1982-83). Romesh's plan was revised early and was followed by Malhotra's Revised Working Plan (1966-67 to 1980-81) which dealt with all the delimited Protected Un delimited Protected and un-classed forests of the division.

**1.7.2. PAST SYSTEMS OF MANAGEMENT AND THEIR RESULTS:** The period, 1846 to 1980-81, can be divided into three distinct periods from management point of view: -

- (i) The period of organization (1846 to 1894), the forests remained under the management of the Deputy Commissioner and forest-estates were consolidated and demarcated.
- (ii) The period of transition (1894 to 1903), various categories of forests were constituted and modified under Indian Forest Act.
- (iii) The period of scientific management (1903-4 to 1980-81), the forests were managed under regular working plans.

The system of management during each period is described as under:

**1.7.2.1. THE PERIOD OF ORGANISATION (1846-1894):** This period is very significant from the point view of consolidation, demarcation etc. of the forest-estates. The Deputy Commissioner through Simple Forest Conservancy Rules managed the forests. The conservancy rules contained in the Barne's Land Revenue Settlement (1849-52) asserted the exclusive right of the Government to sell timber, prohibited cutting of green wood for fuel and made an order of the village headman necessary before felling of trees for building purposes. The laxity of the system, however, failed to protect the forests from misuse. Bailey modified these rules in 1853. Bailey's Code of Rules provided for stricter system of forest conservancy. It provided the closure of one third of all forests (trihais) for regeneration and in the remaining forests, prohibition of grass burning in the winter, extension if cultivation without permission, Forest assistants in each Pargana were also appointed.

In 1855, the "General Rules for forest Conservancy in Punjab Hill Tracts" was introduced and under its provisions Colonel Lake, the then Commissioner, made certain amendments to the Bailey's Rules, which were sanctioned by the Lieutenant Governor in 1859. These rules made necessary for the zamindars to apply to the Tehsildar for all timber required for building or agricultural purposes and to pay a light fee for the same instead of getting it free by applying to the village-headman. On the other hand, 1/4<sup>th</sup> share in the value of the timber sold annually by the Government was to be awarded to the village officials and village community, with the object to securing their interest and co-operation in forest conservancy. These two measures laid the foundation of what are now called the grant of trees at Zamindari-rate (Z-rate) and the distribution of Zamindari Share (Z-share).

In 1859 and 1860, the trihais in each mauza were delineated and closed to the exercise of rights. Only the first trihai was marked and no arrangement was made to close in rotation the remaining areas, as was the original intention. During Anderson's Settlement the original trihais were further notified in 1897 for closure for a period of 20 year and, thus, majority of the areas closed in 1860 remained closed unto 1917 i.e. for a period of 57 years. The effect of this long closure was extremely beneficial to the closed areas. Sufficient natural regeneration of Chil was obtained which now forms mature crop. The rest of the forests, being inadequately protected by the rules and subjected to an increased pressure of rights for a very long time, deteriorated considerably. So much so that many of them reached the state of getting almost extinct.

As far as the export fellings are concerned, chil trees sold to the traders by the Deputy Commissioner at a fixed rate of Rs. 8/- per tree. Only sound trees of large dimensions and form from the accessible localities were removed. In case of oak and fir also, the traders obtained permit at fixed rates irrespective of the size of the trees and therefore, only the best and mature trees from accessible areas were removed. However, since the demand was not heavy and young and middle-aged trees were not touched the results were not very injurious to the forests.

**1.7.2.2. THE PERIOD OF TRANSITION (1894 to 1903):** The management of the forests was transferred to the Forest Department in 1894. The forest settlements were completed and various categories of forests were notified under the Indian Forest Act. The old system of management continued, more or less unchanged. However, a system of improvement fellings, bearing on all age-classes in accordance with the silvicultural requirements of the crop, was introduced in the chil, oak and fir forests.

**1.7.2.3. THE PERIOD OF SCIENTIFIC MANAGEMENT (1903-04 to 1980-81):** During this period most of the forests were managed under regular working plan discussed, in brief, as under: -

**1.7.2.3.1. HART'S WORKING PLAN (1903-04 to 1920):** The main objects of management were to bring the whole workable area under regular treatment, to provide for the realization of sustained annual yield primarily for satisfaction of the legitimate requirements of the right holders and the surplus, if any, to be sold. A total area of 46,708 ha (including the areas in the present Una, Nurpur, Hamirpur, Dharamshala and Dehra Forest Divisions) was considered workable and dealt with accordance. Seven working circles, as discussed below were distinguished: -

**1.7.2.3.2. THE PINE WORKING CIRCLE:** A system of "Improvement Fellings with thinnings" was prescribed on a felling cycle of 20 years. Each Tehsil constituted a separate felling series. Exploitable girth of two meters, corresponding to the age of 90 years, was fixed. Fellings were in arrears till the middle of the plan. The position was improved subsequently by allowing traders to



fall large size trees. This resulted in removal of larger trees from all over, but dense crops in need of thinnings were left untouched. The position was improved to some extent by carrying out special thinnings and giving trees to the right-holders.

**1.7.2.3.3. THE SCRUB WORKING CIRCLE:** A system of “Coppice with standard’s with a rotation of 20 years was prescribed, 25 standards were to be retained per acre. As there was practically no demand, no definite fellings were prescribed. In 1907, however, some demand arose and some of the trihais were wholly or partly worked.

**1.7.2.3.4. THE OAK-COPPICE WORKING CIRCLE:** A system of “Coppice with standard’s on a rotation of 25 years for coppice was prescribed. 25 standards of oak and 50 of sal were to be retained. Kandbari trihal was not worked at all and in D.P. Andretta an area of 30 ha. Required to be felled in the first five years was felled only after 1917-18.

**1.7.2.3.5. OTHER WORKING CIRCLES:** These were worked on Selection System”. In the Oak High Forest Working Circle and the Fir Working Circle no fellings took place, as there was no demand. In the Deodar Working Circle, due to limited demand, only sixty six percent of the selection trees were removed.

On the whole, the results of Hart’s Plan were satisfactory. Many of the prescriptions could not be carried out due to lack of demand. The chil forests improved by thinning and by removal of over-mature stock, generally of poor quality.

Hart’s Working Plan did not actually expire till 1922-23 but poor progress of chil regeneration combined with another very important development i.e. preparation of a scheme of rotational closures made its early revision necessary.

### **1.7.3. THE SCHEME OF ROTATIONAL CLOSURES BY MITCHELL AND WALTERS (1919):**

The background of the preparation of the scheme has been dealt with in para 1.1.8.8. (Chapter I). The details of the scheme are to be found in the special report submitted to the Government by Mitchell and Walters in 1919 (Report on the delimitation of areas to be subjected to a scheme of Rotational Closures in Kangra proper). The scheme did not include the forests of Bara-Banghal and the Jagir forests.

The delimited protected Forests (subjected to this scheme) were divided into a number of closure Series. Each Closure Series in chil, oak and fir forests was divided into four parts to be closed, in rotation, for thirty years while in the case of the scrub forests each Closure Series was divided into three parts to be closed, in rotation, up to ten years. The first closure was marked on the ground

and sequence of the other closures was shown on maps and kept in a bound register called the English Register. The internal boundaries of the closures, though subject to slight modifications in particular cases, are binding. The sequence of closure is at choice only in cases where the zamindars exercising rights in the Closure Series in question are unaffected by closures in any other series. However, in the case of oak and fir forests go Chakban tikas of Jiya, Chachian, Kandbari, Sansal and tika Billing of mauza Bir the conditions were found to be exceptional. They contained vast areas above the tree line in the form of alpine pastures. Therefore, no general delimitation separating such areas from the workable forests was undertaken and to avoid distrust, only the first closures were delimited.

In 1921, the Government accepted the scheme and also ordered that in every case where the closure of more than  $1/3^{\text{rd}}$  of a scrub forest and  $1/4^{\text{th}}$  of other forests was contemplated, the Commissioner should satisfy himself that the area left open were adequate for the use of the people.

The Rotational Closure Scheme provided a satisfactory solution to the problem of selection and notification of closures so far as the delimited protected forests were concerned, but simultaneously it increases the risk of destruction of the forests not included in the delimitation. In terms of forest management, the scheme resulted, in case of high forests, in a system of fixed periodic blocks with regeneration period and rotation of 30 and 120 years respectively. In case of scrub forests, closure for a period of ten years was considered to be sufficient, a presumption which was perhaps hardly justified.

**1.7.4. WALTERS REVISED WORKING PLAN (1920-21 to 1929-30):** All Delimited Protected Forests of the division and Un delimited Protected Forests only Chhota and Bara Banghal were covered by the plan. The Oak Coppice Working Circle and the scrub Working Circle of Hart's plan were included under one Coppice Working Circle, his Deodar and Fir working Circles were amalgamated into one circle and a new workable Working Circle comprising of the unworkable delimited protected scrub forests and all Un delimited Protected Forests was created.

The objects of management in all the high forests were the replacement of the then existing irregular crop by even aged crops normally distributed over four age-classes, the maintenance of trees of all sizes in each block of forest forming a complete Closure Series for the satisfaction of rights, realization of the maximum sustained yield, and realization of maximum revenue from the surplus yield after meeting the demands of the right holders.

The results of management under various working circles are summarized as under: -

**1.7.4.1. THE KANGRA PINE WORKING CIRCLE:** Uniform system with artificial regeneration was prescribed. The first closure of each closure series was allotted to P B I. Subsidiary fellings, with the aim of removing the over-mature trees standing over pole crop along with fellings of other trees strictly in accordance with silvicultural principles were prescribed in the other periodic blocks.

Only 50% of the PBI area was subjected to regeneration fellings while only about 25% of the felled area could be regenerated. Most of the regeneration was obtained by natural means.

**1.7.4.2. THE OAK WORKING CIRCLES:** Uniform system with artificial regeneration was prescribed but in kharsu-oak forests, natural regeneration was to be relied upon. Owing to lack of demand, only about 25% of the PBI area could be felled and out of this only 8% could be regenerated.

**1.7.4.3. THE DEODAR AND FIR WORKING CIRCLE:** The system of management was the same as in the Kangra Pine Working Circle. The progress of fellings and regeneration was poor. About 50% of the prescribed area was felled.

**1.7.4.4. THE COPPICE WORKING CIRCLE:** The system adopted was "Coppice with Standards" and sowing was prescribed to be carried out irrespective of the area having been felled or not. There being no demand for the produce a large number of forests could not be worked and the prescriptions remained in arrears.

**1.7.4.5. THE UNWORKABLE WORKING CIRCLE:** This working circle included the unworkable delimited protected forests, all undelimited protected forests for which no system of working could be proposed and the alpine pastures which could not be closed. Almost the entire area proposed for closure in the Rotational Closure Scheme was closed and the results were beneficial. The rest of the area, open to the exercise of rights as they were, continued to deteriorate.

In order to fully appreciate the working position, the following factors leading to lack of demand hence to deficits in all the working circles must be borne in mind: -

The plan was prepared during the period of trade boom following the First World War and it had been expected that the stimulus, which almost every business had received, would be maintained. But the things proved to the contrary and slump in the market adversely affected the demand of forest products.

The uniform system was applied to all high forests without taking into consideration the nature of the terrain, the density of the crop and the ecological status of the vegetation. This wholesale application of the system, combined with

the fact that many forests were already so open that regeneration fellings were not feasible, resulted in prescription of a yield, which was beyond the actual capacity of the forests. The data relating to increment was also not sound and, therefore, a high increment (over 100% in 30 years in case of the Kangra Pine Working Circle) was adopted. No deduction for the volume of the seed-bearers to be retained was made. All these contributed to fixation of a much higher yield.

Immediately after the plan came into operation a widespread conflagration broke out in 1921, which not only adversely affected the pace of regeneration in the low hills but also destroyed a large number of trees, which had been relied upon for much of the increment.

**1.7.5. MOHAN'S REVISED WORKING PLAN (1931-32 to 1950-51):** The plan dealt with all delimited protected forests and some more important un-classed forests of this division. The results of working in different working circles were as under: -

**1.7.5.1. THE CHIL SHELTERWOOD WORKING CIRCLE:** This circle was comprised of better-stocked chil forests of Walter's Kangra Pine working circle excluding some areas on account of poor stocking and precipitous terrain. Two felling series were formed Felling Series No. I and Felling Series No. II. In Felling Series I surplus timber was to be sold to the traders while Felling Series II was to meet the local demand. The system prescribed was the Shelterwood system with fixed periodic blocks; natural regeneration to be supplemented, where necessary, by sowings. The rotation and the period of regeneration were fixed at 120 and 30 years respectively in accordance with the scheme of Rotational Closures. A regeneration period of ten years had already expired when the plan came into force and, thus, regeneration of all the P.B.I area was to be completed by the end of the plan i.e. 1950-51. Being of the view that chil, in this locality, does not require a very heavy opening of canopy to induce natural regeneration and also in view of the fact that only 25% of the PBI area was regenerated during Walter's plan leaving most of the P.B.I. areas to be regenerated within the remaining period of 20 years, Mohan prescribed all P.B.I area to be closed at once without waiting for seeding fellings. About 80% of P.B.I area was regenerated. Most of the un-regenerated areas were in the Un-stable Sub-type, which were being invaded by scrub. Fires also added to the difficulty of obtaining regeneration.

The yield in P.B.I was in excess by about 17% at the end of the plan. The excess was mainly due to the conservative estimate of yield (two I class trees were prescribed to be left in P.B.I as fire insurance at the end of regeneration period) and the forest fires, which necessitated removal of burnt trees. The general condition of P.B.I areas, however, was fairly satisfactory and the excess yield had not deleted the growing-stock.

No fellings were prescribed in P.B.II., P.B.III and P.B. IV, thinning and improvement fellings on very conservative lines were prescribed; yield was to be

controlled by area. In a number of forests, thinning could not be carried out owing to the lack of demand and also due to the prescribed "tika-war" system of thinning that required thinning of 1/10<sup>th</sup> of the forests in each tika annually which was not practicable. But due heavy demands for chil poles during the Second World War, all these arrear fellings were made up. The results were on the whole satisfactory.

**1.7.5.2. THE OAK SHELTERWOOD WORKING CIRCLES:** This circle contained the workable ban-oak and a few kharsu oak forests. P.21.P. Andretta of the Coppice Working Circle of Walter's plan was transferred to this working circle for conversion into High forest. Two felling series; No.I containing High forests and No. II comprising coppice forests were distinguished.

The silvicultural system prescribed was the "Shelterwood Conversion System" with artificial regeneration in Felling Series I and "Aubert's System of Conversion from coppice to High forests" in Felling Series No. II. Technical rotation of 120 years with regeneration period of 30 years required by the Rotational Closure Scheme was adopted.

Due to poor demand, the fellings could not be carried out as contemplated. About 80% of the P.B.I area was regenerated. In Felling Series No. II however, the felling were fully carried out which resulted in marked improvement of the crop.

**1.7.5.3. THE COPPICE WORKING CIRCLE:** The forests allotted to this circle were mostly of the scrub type. Two felling series, viz. (I) Merchantable and (ii) Un merchantable, were formed with the provision of transferring areas from the latter to the former in case of subsequent demand.

The system prescribed was "Coppice with Standards". About 50-75 standards per ha.were to be retained. Rotation of 30 years for coppice and of 90 for standards, keeping in view the provisions of the Rotational Closures Schemes, was fixed.

The yield was prescribed by area. There was a steady demand for firewood during the period, especially due to the outbreak of the Second World War and establishment of Yol and other camps in the valley. The fellings were, therefore, carried out as prescribed except for a few far-away areas. The fellings resulted in vigorous coppice shoots by regeneration by seed was generally lacking. On the whole, the prescriptions worked very satisfactorily for the working circle.

**1.7.5.4. THE SELECTION WORKING CIRCLE:** the forests included in this working circle were generally situated on precipitous slopes and those, which could not be closed due their legal status, and, therefore, working on very conservative lines only could be feasible. Three felling series were formed; (I) Merchantable, consisting of workable forests (ii) Unmerchantable, consisting of areas considered to be unworkable for want of demand and (iii) Unclassed,

consisting of the unclassed forests of the circle where closure could not be enforced without consent of the right-holders.

The system prescribed was the "Selection System" combined with thinning with a felling cycle of 10 years. The yield for the first and third fellings series was prescribed by number of trees for the whole plan period instead of annual. About 50% of the I class trees prescribed for felling were removed. The deficit was, however, due to lack of demand. In the areas closed to grazing good amount of regeneration was obtained while in others it was completely absent.

**1.7.5.5. THE PROTECTION WORKING CIRCLE:** This circle included a heterogeneous mixture of species in all categories of forests. Four felling series viz. (i) Reserve Felling Series comprising of Reserved Forests (not in this division), (ii) Tricennial and (iii) Decennial Closure Felling Series, comprising of the delimited protected forests according to the closure period of 30 and 10 years respectively and (iv) Un-classed Felling Series, consisting of the un-classed forests were constituted.

The main object of this circle was protection against denudation and erosion. Closures were prescribed in accordance with the status of the forests and settlement provisions. No fellings were prescribed except to meet the requirements of the right holders, to be made on the principles of conservative selection fellings and thinnings. Extensive chil sowings were prescribed but could be carried out only on a limited scale. Chil regeneration established itself in favourable localities while in other areas there was increase in the proportion of scrub.

The object of forming this circle was very well achieved; the blanks were covered with some vegetation of one type or other. The process of erosion was checked and the general condition of the soil improved considerably.

**1.7.5.6. THE SUMMERY OF RESULTS OF MOHAN'S PLAN:** - The prescriptions and suggestions of various working circles were almost fully implemented. Shelterwood System introduced by Walters in 1921 and continued in this plan for chil and oak proved suitable. In all working circles, natural regeneration was adequate and fairly good artificial regeneration was obtained. The demands of right holders were fully met with. Fellings, except in the chil Shelterwood Working Circle, were only slightly behind the schedule and proved beneficial to the crop. Large number of buildings, roads and bridle paths were constructed. Deodar was introduced artificially, though on a limited scale, in P.14 P. Kandbari Comptt. 2a and P.9 P. Bir Comptt.3a, which, however, have not proved very encouraging due to adverse locality, factors, particularly heavy rainfall along the Dhauladhar.

**1.7.6. ROMESH'S REVISED WORKING PLAN (1950-51 TO 1980-81):** - All the delimited protected and some important and valuable unclassed forests of the Division, except those transferred to the Kangra Co-operative Forest Societies

and those of Chhota Banghal, were dealt in this plan. For the forests of Chhota Banghal and those under the Co-operative Forests Societies separate Workings Plans were prepared and are being discussed separately.

Only those working circles, which covered the forests of this division, are dealt with as under: -

**1.7.6.1. THE CHIL SHELTERWOOD WORKING CIRCLES:** - This circle contained better-stocked and economically more important chil forests. In addition to the forests of Mohan's Chil Shelterwood Working Circle, some chil areas of the Protection Working Circle considered as better stocked were also included.

The silvicultural System adopted was "The Punjab Shelterwood System" with reliance mainly on natural regeneration, supplemented by artificial means at lower altitudes. A rotation of 120 years with a regeneration of 30 years, keeping in view the requirements of the Rotational closure Scheme, was adopted. The period of closure (commencing from 1921) had expired on 31<sup>st</sup> March 1951 and the 2<sup>nd</sup> period of 30 years started from 1<sup>st</sup> April 1951; the regeneration was thus, to be completed in all the P.B.I areas by 31<sup>st</sup> March 1981.

Most of the P.B.I areas were closed in 1951, on the consideration already dealt with in Mohan's Plan. The control of yield was by volume. The seeding fellings were to be completed within the forest ten years of plan. No sequence of fellings was however, prescribed.

During the period 1951-52 to 1965-66 (when this plan was revised an area of 943 ha. against the total prescribed area of 1622 ha. (For the entire tract with in the plan) i.e. about 60% was felled, whereas excess yield of 3668 cum. against the total prescribed yield of 54,600 cum. (for 15 years). i.e. about 7% of the total, was removed. Out of 2230 ha. of P.B.I area only 259 ha. could be regenerated fully and 140 ha. moderately. In the remaining area regeneration was not keeping pace.

No felling was prescribed for P.B.II but in P.B.III, thinnings were to be carried out. In P.B. IV, fellings of the remaining seed bearers along with cleaning and thinnings was to be carried out. Both these types of fellings in these P.B.'s, however, remained in arrears.

**1.7.6.2. THE OAK SHELTERWOOD WORKING CIRCLES:** - This circle contained most of the workable ban oak and a few kharsu oak forests. This was essentially the same as in Mohan's Plan except that some areas having poor density were excluded and transferred to the Protection Working Circle. But for the areas already regenerated, the forests of this circle were much under stocked.

The silvicultural system adopted was “The Punjab Shelterwood system” with mainly artificial regeneration. The rotation and regeneration period of 120 years and 30 years respectively were adopted (in consonance with the Rotational Closure Scheme). The second period, as already explained in the Chil Working Circle, started from 1<sup>st</sup> April 1951 and therefore, all the P.B.I. areas were to be regenerated by 1981.

The yield in P.B.I was prescribed by volume. About 90% of the areas were felled during 1951-52 to 1965-66, whereas the volume (charcoal equivalent in qtls) removed was in deficit by 25%. The deficit is ascribed to overestimation of the yield. About 40% of P.B.I area was completely or moderately regenerated.

In P.B.IV areas, the few mother trees standing over the young crop were to be removed to meet the demands of the right holders and excess was to be sold. The young crop was to be cleaned and thinned at intervals of ten years. About 80% of the prescribed area was felled during the plan period.

**1.7.6.3. THE COPPICE WORKING CIRCLE:** - This working circle comprised of fully stocked, better type, scrub forests. The working circle was much the same as the corresponding working circle in Mohan’s plan except that some forests of the Protection Working Circle that had been improved during the previous 30 years were also included. The silvicultural system to be the “Coppice with Standards; 50 standard per ha were to be retained. The rotation for coppice was kept at 30 years and for standards at 90 years. The yield was prescribed by area; being 1/10<sup>th</sup> of each closure series. Each compartment was to be divided into 10 coupes, which caused much difficulty in correct demarcation of the annual coupes on the ground and invariably resulted in complaints from the purchasers of the coupes. Closure and regeneration of such small area was also a problem. The fellings could not take place as contemplated due to coupes not being sold on account of their sizes being too small. About 80% of the prescribed area was felled. Eucalyptus was introduced in the felled areas, which proved successful initially, but later on, its growth was found to be inadequate, and therefore, its further planting was discontinued from 1966-67 onwards.

**1.7.6.4. THE SELECTION WORKING CIRCLE:** This circle contained the delimited Protected and Un-classed Forests situated on steep and broken ground and contained an irregular crop of heterogeneous mixture of various spp.

The silvicultural system adopted was the “Selection System” combined with thinnings. The exploitable-size was fixed at 60-cm d.b.h. for all species. A felling-cycle of 10 years was adopted. Reliance was mainly on natural regeneration. The yield fixed as 33 % of I class (selection) trees was prescribed forest-wise for the whole plan period. Felling of trees below 60-cm d.b.h. was to be controlled by felling rules and no yield for such trees was prescribed.



Almost all the areas due for felling up to 1965-66 were gone over and the crop improved considerably due to removal of the mature and over-mature trees carrying out of thinnings. Regeneration did not come up as expected for want of effective closures.

**1.7.6.5. THE PROTECTION WORKING CIRCLE:** This working circle included those Delimited Protected and Un-classed Forests in which the object of management was simple protection in order to check their steady deterioration and to improve the conditions of the growing stock. The vegetation included all sorts of species i.e. the scrub, chil, oaks, fir and spruce along with alpine and sub alpine pastures. Density of the crop was invariable poor, blanks being quite common and the ground was precipitous with frequent landslips. Four felling series, as in the Mohan's plan were constituted.

No definite silvicultural system and, therefore, no fellings were prescribed except those for the requirement of the right holders. The trees to the right-holders were to be marked under very conservative selection fellings and thinnings, Artificial regeneration of chil, khair, shisham and oak etc, was prescribed to be done in suitable localities. Little effort was made to carry out regeneration operations; the areas were simple closed. In the year 1962-63 to 1965-66 some of the accessible areas were planted with eucalyptus after clear fellings. The growth and development of eucalyptus, however, was not considered satisfactory and, therefore, further attempts on these lines were abandoned.

**1.7.6.6. THE PLANTATION WORKING CIRCLE:** This working circle was created in 1965-66. A felling and plantation programme was drawn up. The forests allotted to this circle were to be worked on "Clear- felling system; followed by plantation of chil, khair, bamboo, eucalyptus etc depending upon the soil and other factors.

The allotment of areas to this working circle was done haphazardly, ignoring the site conditions. Some areas of the Protection Working Circle, though not fit for clear fellings, were also allotted to this circle. Stress was laid on planting of eucalyptus, which was generally not suited to the locality.

**1.7.7. MALHOTRA'S REVISED WORKING PLAN: (1966-67 to 1980-81):** Though Romesh's Plan was to expire in 1980-81, with an interim revision after 15 years, the reorganization of the division coupled with keenness to bring the vast areas of the Un-delimited Protected and Un-classed Forests under regular management made complete revision of Romesh's plan a necessity.

The Revised plan included all the Delimited, Un-delimited Protected and Un-classed Forests of the division, except those under the Co-operative Forest Societies.

All the working circles were divided into two felling series; (I) Legal Closure Felling Series (Felling Series I) and (ii) Voluntary Closure Felling Series (Felling Series II), The felling series I comprised of the Delimited Protected Forests whereas the felling series II comprised of the Un delimited Protected and the Un classed Forests. The following working circles were constituted:

**1.7.7.1. THE CHIL SHELTERWOOD WORKING CIRCLE:** - An area of 2789 ha of all the three classes of forests of this division was allotted to this circle. The forests, on the whole, were under-stocked, irregular, poor in growth and heavily burdened with rights. The Un-delimited Protected and Un-classed Forests, brought under regular management for the first time, had been treated mercilessly in the past. The area under each felling series (as explained above) was 1296 ha in Felling Series I and 1493 ha in Felling Series II. The main object of management was to convert the irregular chil forests into more or less regular crops. Complete enumeration of chil trees in PB I of the Felling Series I, and all over in the Felling Series II was done. The average growing stock per ha. was 64.52 m<sup>3</sup> in Felling Series I and 51.10 m<sup>3</sup> in Felling Series II.

The forests were to be managed under the “Punjab Shelterwood System” with natural regeneration to be supplemented by planting, wherever necessary. Compact groups of well-growth poles up to 35 cm d.b.h. and at least 0.2 ha in extent were to be retained as advance growth. Rotation of 120 years with regeneration period of 30 years (in conformity with the requirements of the Rotational Closure Scheme) was adopted. In Felling Series I, allotment to all the four periodic blocks was made. But in the case of Felling Series II, only P.B.I areas were allotted, the remaining areas were grouped as PB others. Only two regeneration fellings viz., seeding felling and final felling were to be carried out in P.B.I. Final felling was to be carried out when the regeneration was at least 2 m high and the area control-burnt at least twice. In P.B.II, no fellings except for the removal of fallen, dead and dry trees was prescribed. In P.B.III, thinning and in P.B.IV, removal of the remaining over wood along with thinning in congested groups were prescribed.

The yield was prescribed by volume and calculated separately for P.B.I of each felling series and P.B.IV of Felling Series I. The control of thinning in P.B.III and P.B.IV was by area. P.B. Others of Felling Series II were meant only to meet the right-holders demand and therefore, no yield was prescribed. Yield from P.B.I was calculated by deducting from the existing growing stock (20 cm d.b.h. and above) the volume of the advance growth to be retained. Though, annual yield was calculated, but no annual control was prescribed; the control of yield was to be exercised at the end of the plan. All trees of IV class and above removed from P.B.I and all trees III class above removed under salvage felling from P.B.II were to count against the yield of P.B.I Sequence of seeding fellings and final fellings (for the Felling Series I) were prescribed. Main yield from P.B.IV was calculated on the basis of percentage of I and II class trees available for felling.

**1.7.7.2. THE OAK SHELTERWOOD WORKING CIRCLE:** - This working circle was comprised of the workable ban and kharsu areas in the Delimited protected Forests. The forests were under stocked, heavily lopped and over-grazed. The crop was mainly middle aged to mature and deficient in young age classes. No enumerations were carried out; instead, the enumeration data of Romesh's plan was used. The objects of management were protection and preservation of the forests; introduction of more valuable species such as chil, kail and deodar in suitable sites; to obtain maximum possible yield of firewood and charcoal; and to meet the local fodder and grazing requirements. The forests were to be managed under "The Punjab Shelterwood System" with artificial regeneration. Rotation of 120 years and regeneration period of 30 years were adopted. Definite allotments to P.B. I and P.B. IV were made. The remaining areas were grouped as P.B. unallotted.

In P.B. I areas mother trees 25 to 40 per ha. were to be retained. Compact groups of poles up to 40 cm. d.b.h. but not less than 0.2 ha. in extent were to be retained as part of the future crop. Final fellings were to be carried out when the young crop was at least 2 m. high. The main yield was calculated in terms of charcoal equivalent, and was fixed as 400 quintals charcoal. The intermediate yield, in P.B. IV was regulated by area.

**1.7.7.3. THE CHHOTA-BANGHAL WORKING CIRCLE:** - The poorly stocked coniferous of Chhota-Banghal were allotted to this working circle. Most of the forests contained mature and over-mature stock of spruce and fir with pure blocks of kharsu in higher reaches. The main object of management was to convert the irregular forests into normal uniform crop and obtain maximum sustained yield of timber for meeting the demands of the right-holders.

The forests were to be managed under the "Shelterwood System" with artificial regeneration. A conversion period of 90 years with a regeneration period of 30 years was adopted. The areas to be felled during the plan period were allotted to P.B. I, and remaining areas were grouped together as P.B. Unallotted. Mother trees at the rate of 30 to 40 per ha. were to be retained. All poles up to 40 cm. d.b.h. were to be retained as part of future crop. Yield was neither calculated nor prescribed. A total area of 223.76 ha. was prescribed for felling from 1976-77 onwards. However fellings were to take place only if sufficient nursery stock was available and closure was assured.

**1.7.7.4. THE PLANTATION WORKING CIRCLE:** - The forests which were either under-stocked, stocked with useless brush-wood species or having large blanks and where raising of plantations was considered feasible were allotted to this working circle. Two felling series as described earlier were constituted. The objects of management were to replace the blanks and useless scrub growth with economically more valuable species and to nurse the existing young plantations. "Modified Clear Felling system" with artificial regeneration was adopted. About 35-40 standard per ha. were to be retained for seed, shade. Large sized timber etc.

Khair trees below 15 cm. d.b.h. and chil trees unless diseased, dry or fallen were not to be felled in Felling Series II, however, no fellings except to meet the demand of right holders were to be take place. Khair and chil were the main species prescribed for planting. Bamboos were also to be planted in fertile pockets in low-lying forest areas.

**1.7.7.5. THE AVENUE WORKING CIRCLE:** - The PWD roadsides and the Railway line-strips available to the Forest Department for management were allotted to this working circle. These contained young to mature trees of various broad-leaved species. The crop was generally patchy and irregular. The area was suffering badly from grazing, lopping, debarking etc. Two felling series: one each for PWD roads and railway line strips, were constituted. The growing stock along the PWD roads was much below the normal; the position of regeneration was unsatisfactory. The main object of management was to restock the blanks with the species of aesthetic and economic value and, thus to improve the growing stock. No definite silvicultural system was prescribed. However, removal of dead, dying, diseased trees and of those causing hindrance to the traffic was allowed. Planting programme for the two series was laid down. Since the planting along the PWD roadsides was the duty of Public Works Department and not of the Forest Department, the planting programme as laid down was not followed.

**1.7.7.6. THE PROTECTION WORKING CIRCLE:** - This working circle comprised of all types of forests situated on difficult and precipitous terrain or at other erodable situations such as banks of the streams and nallas. Alpine pastures and other blank areas where soil was too shallow to carryout any planting were also allotted to this working circle. Two felling series as in other working circles were constituted. No definite silvicultural system was prescribed. Felling of trees to meet the local demands on silvicultural principles was allowed. Sowing and planting programme for each felling series was laid down. There was, however, no restriction for the divisional staff to take up any other area not included in the planting programme. Misc. regulations such as closure of the area to be planted, regulation of the grazing, grass cutting and lopping were laid down which were partly implemented.

Majority of the areas prescribed have been closed and planted to the extent possible. The planting programme was laid down mainly for the low-lying areas and no treatment for improvement of the crop or restocking of blanks in respect of higher areas was suggested. Moreover, planting of big chunks was not possible in view of the problem in obtaining such large-scale closures. However, the prescriptions have generally helped the areas of this circle to stabilize and improve.

**1.7.7.7. THE BARA-BANGHAL WORKING CIRCLE:** - All the Un-delimited Protected Forests of Bara-Banghal valley having mixed crop of various conifers, broad-leaved species and the alpine pastures were allotted to this working circle. The object of management was mainly to afford protection to the hillsides and to

exploit mature and over-mature trees. No silvicultural system was prescribed as the areas were simply to be protected and preserved. Removals, mainly of sanitary type by exploiting over-mature (above 60 cm. d.b.h.) and dead, dying, diseased, suppressed, malformed and fallen trees were prescribed. No felling programme was laid down, any definite prescriptions for regeneration and other silvicultural operations were made.

**1.7.7.7.8. THE GRAZING WORKING CIRCLE:** - This was an overlapping working circle divided into four zones viz; Alpine zone, Higher zone, Middle zone, and Lower zone. The object of management was to provide grazing and fodder for the requirement of the right holders. Assessment of the productivity of grazing lands was made, the details of cattle population of local and migratory and nomadic graziers were given. In order to evolve sound grazing policy some measures as (i) revision of settlement (ii) conversion of grazing lands in to ghasnies (iii) increase in grazing fee, (iv) planting of fodder species etc. was suggested.

**1.7.8. FOREST OF CO-OPERATIVE FOREST SOCIETIES:** - The forests under the control of Co-operative Forest societies were managed under the working plans for other Government forests up to 1941 when these societies were created. Each Co-operative Society had a separate working plan/working scheme till 1967-68, which is detailed as under in Table: 1.7.1.

**Table: 1.7.1. Name of Working Schemes**

Sr.No.	Name of Co-operative Forest Society	Author of 1 <sup>st</sup> Working Plan.	Author of 2 <sup>nd</sup> Working Plan.
1	2	3	4
1	Arla Saloh	Gurdas Mohan. (1:4.43 to 31.3.53)	E.S. Dass. (1.4.53 to 31.3.68)
2	Balota	E.S. Dass. (1.4.51 to 31.3.66)	-
3	Bhagotla	Gurdas Mohan. (1.4.42 to 31.3.66)	E.S. Dass. (1.4.52 to 31.3.67)
4	Dagera	Mohinder Singh. (1.4.51 to 31.3.66)	-
5	Gaggal	Arjan Singh. (1.4.43 to 31.3.51)	E.S. Dass. (1.4.51 to 31.3.81)
6	Ghadoral	Arjan Singh. (1.4.43 to 31.3.58)	-
7	Gharana	Mohinder Singh. (1.4.51 to 31.3.66)	-

8	Khalet	Arjan Singh. (1.4.42 to 31.3.52)	E.S. Dass. (1.4.52 to 31.3.82)
9	Kusmal	Arjan Singh. (1.4.42 to 31.3.52)	E.S. Dass. (1.4.52 to 31.3.82)
10	Maranda- Bhangiar	Maqbul Ahmad. (1.4.47 to 31.3.62)	Yash Paul. (1.4.62 to 31.3.77)
11	Maniara	Maqbul Ahmad. (1.4.47 to 31.3.62)	-
12	Panapri	Hari Singh. (1.4.41 to 31.3.51)	E.S. Dass. (1.4.51 to 31.3.81)
13	Paror	Gurdas Mohan. (1.4.41 to 31.3.51)	E.S. Dass. (1.4.51 to 31.3.66)
14	Patti	Gurdas Mohan. (1.4.50 to 31.3.70)	-
15	Punner- Dehan	Gurdas Mohan. (1.4.43 to 31.3.53)	E.S. Dass. (1.4.53 to 31.3.68)

The essential of the prescriptions of all these Working Plans were the closures against grazing. With a few exceptions, the commonly recognized Working Circles were as under:

- (i) The Chil Working Circle.
- (ii) The Fuel and Fodder Working Circle.
- (iii) The Plantation Working Circle.
- (iv) The Protection Working Circle.

For the details of the results of working under each Working Circle, Rawal's Integrated Working Plan, as detailed below, be referred to

#### **1.7.8.1. RAWAL'S INTEGRATED WORKING PLAN (1968-69 to 1982-83):**

- The working of forests under each working circle in respect of above 15 Co-operative Forest Societies in this division are discussed as under:

**1.7.8.1.1. CHIL WORKING CIRCLE:** - A total of 687.02 ha. having almost pure chil forests was allotted to this circle. The system and principles of management generally were the same as in Romesh's Working Plan, as discussed in para 1.5.6.1. except that the yield was regulated by area and not by volume. A total area of 436.24 ha. (P.B.-I=74.43 ha. P.B.-III=196.62ha., P.B.-IV=192.19 ha.) was prescribed for fellings, under the marking rules of the respective periodic blocks. The P.B.-I areas were prescribed to be regenerated artificially with chil either by sowing or planting. A sowing/planting programme for the P.B.-I areas where no regeneration fellings were required to be done because of the area being already open enough was laid down.

**1.7.8.1.2. THE BAN OAK WORKING CIRCLE:** - Only one C.F.S. Ghadoral (4.05ha.) was allotted to this working circle. No felling and sowing/planting were prescribed to this forest.

**1.7.8.1.3. THE FUEL AND FODDER WORKING CIRCLE:** - An area of 514.26 ha. of denuded or semi-denuded scrub forests adjoining the habitations and mostly used as grazing grounds and for meeting the day-to-day requirement of fuel, fodder, wood for agricultural implements etc. was allotted to this circle. Preservation and protection of these forests consistent with meeting the above requirement was the object of management. No definite prescriptions were laid out. Rotational Voluntary Closures and rational lopping practices were suggested to be enforced for which detailed lopping rules were laid down.

**1.7.8.1.4. THE COPPICE WITH STANDARD WORKING CIRCLE:** - Comparatively better type of miscellaneous broad-leaved and scrub forests (195.82 ha.) was allotted to circle. The main object of management was protection and preservation consistent with meeting the demands for fodder and fuel. Detailed marking rules were prescribed. An area of 50.20 ha was prescribed for fellings. In addition to coppice growth: sowing, planting of chil, khair, shisham, eucalyptus and siris were recommended. The coupes, whether felled or not, were to remain closed to grazing for a period of 15 years.

**1.7.8.1.5. THE BAMBOO WORKING CIRCLE:** - This is of no practical significance to this division as a negligible area of 4.05 ha. was included in this circle.

**1.7.8.1.6. THE PLANTATION WORKING CIRCLE:** - An area of 428.88 ha. with deep fertile soil having only useless scrubs or being blank was allotted to this circle with the object of restocking it with valuable and economic tree species. This was to be achieved by clear felling the scrub and other useless bushes (though not saleable) and planting mainly chil and khair. Mango, shisham, eucalyptus and bamboos were also suggested to be raised on suitable sites.

**1.7.8.1.7. THE PROTECTION WORKING CIRCLE:** - The forests situated on difficult and precipitous slopes or steadily deteriorating due to continued grazing were allotted to this circle. Area under this working circle in this division was 341.51 ha. The main object of management was to protect these forests from denudation and erosion. No fellings, except to meet the demands of right-holders, were to be done. Planting of chil and khair was proposed. Some soil conservation measures i.e. construction of small check dams and gully plugging were also suggested to be done as per requirement of site. All areas under this working circle were prescribed to remain closed to grazing for 15 years.

**1.7.9. R.A. SINGH'S REVISED WORKING PLAN: (1981-82 TO 1995-96):**  
- The following working circles were constituted: -  
1. The Chil Working circle.  
2. The Ban Oak Working Circle.

3. The Plantation Working Circle.
4. The Protection Working Circle.
5. The Alpine Pasture Improvement Working Circle.
6. The Avenue Working circle.

The critical review of all working circle is as under: -

**1.7.9.1. THE CHIL WORKING CIRCLE:** - All the pure and nearly pure chil forests of this division were allotted to this working circle. The total area of this working circle was 3217.68 ha. The forests on the whole were under-stocked, vastly variable in density and normal distribution of age class is lacking except PB IV and PB III areas of Delimited Protected Forests and Co-operative Forests. The Un-delimited and Un-class Forests were brought under regular management from Malhotra's working plan. Most of these forests have generally pure, young crop raised artificially and middle aged and mature trees are much in deficit. Three felling series were constituted keeping in view the legal status of the forests. These are (i) Rotational closure Felling Series (Felling Series-I) comprising of Delimited Protected Forests with a total area of 976.04 ha. (ii) Volunteer Closure Felling Series (Felling Series -II) comprising the Un-delimited and Un-classed Forests with a total area of 1543.71 ha. (iii) Co-operative Forests Societies Felling Series (Felling Series -III) comprising the 697.03 ha. of forests under the control of co-operative forest societies. The whole area of this working circle was stock mapped on 4" = 1 mile (1:15,840) scale. Total enumeration of chil and some important broad-leaved species was carried out in 10 cm. dia classes down to 10-cm. d.b.h. for whole working circle.

The forests were to be managed under Punjab Shelterwood System. Natural regeneration supplemented by artificial regeneration where ever necessary was to be relied upon. Compact groups of well-grown pole up to 35 cm. d.b.h. and at least 0.2 ha.in extent were to be retained as advanced growth. The rotation of 120 years in conformity with the scheme of rotational closure was adopted. Forests of Felling Series I are under the process of conversion since Walter's Plan. Regeneration period of 30 years was adopted. Four periodic blocks were constituted with a specific for Felling Series Felling Series III and I whereas for Felling Series II only P.B. I areas were allotted, rest of the area being grouped as P.B. Others. Only two regeneration fellings viz. seeding felling and final felling were to be carried out in P.B. I. Final felling was to be carried out when the regeneration was at least 2m. high and area control burnt twice. In P.B.II no fellings except for the removal of fallen, dead and dry trees was prescribed. In P.B. III thinning and in P.B.IV removal of remaining over-wood along with thinning in congested groups were prescribed.

The yield was prescribed by volume and was calculated separately for P.B.I of Felling Series-I & II and P.B.IV of Felling Series I. The control of thinning in P.B.III and P.B.IV was by area. P.B. Others of Felling Series II were meant only to meet the right holders demand and therefore, no yield was prescribed. Yield from P.B.I was calculated by deducting from the existing growing stock volume of 20



trees / ha. (III-5, IIA-8, IIB-7) to be retained as seed bears and volume of 25% of V and IV class trees to be retained as advance growth. In felling Series I total annual increment over the entire felling Series was worked out to be 2500 cum. The annual yield according to Simmons Modification of Von Mantle formula and by Austrian Assessment method was calculated which gives 2200 cum. a utilization of 1.75%. Out of this 2200 cum. yield, 1200 cum. was to be realized from seeding felling of P. B.I areas, 500 cum. from removal of over wood from P.B.IV and 500 cum. from thinning, improvement felling and cleanings in P.B.III and P.B. IV and was reserved for right-holders. The annual yield prescribed from Felling Series II was 1300 cum. out of this 550 cum. was to be realized from P.B.I as seeding felling and 750 cum. from P.B. others by way of improvement felling, thinning, cleaning etc. and was reserved for the right-holders. In Felling Series III no yield was prescribed due to the young and middle-aged growing stock, which results in to higher increment without corresponding mature stock to harvest. A deviation of 25 % in annual yield was allowed provided the cumulative yield for period of five years remain with in 10 %.

**1.7.9.1.1. RESULTS OF WORKING:** - The position of yield in each Periodic Block Felling Series wise as on 31.3.2010 is as under in Table: 1.7.2

**Table: 1.7.2.Position of Yield as on 31.3.2010.**

<b>Sr. No.</b>	<b>Felling Series.</b>	<b>Periodic Block.</b>	<b>Excess / Deficit (cum.)</b>
1	Felling Series I	PB-I	(-) 18473.351
		PB-II	(+) 10778.773
		PB-III	(-) 2700.652
		PB-IV	(-) 5180.948
2	Felling Series II	PB-I	(-) 6755.100
		PB-others	(-) 4569.566
3	Felling Series III	P.B-I	(+) 2769.250
		P.B-II	(+)3022.704
		P.B-III	(+)4388.986
		P.B-IV	(+)6603.227

In Felling Series I vide para 71.1 (a) an area of 268.24 ha was prescribed for seeding felling in P.B.I and 71.1 (b) an area of 164.70 ha was prescribed for final felling cum thinning in P.B.IV. Similarly sequence for seeding felling was laid down vide para 71.2 wherein an area of 359.33 ha was prescribed for seeding felling in P.B.I of Felling Series II. During the plan period only 13.35 ha of P.B.I in Felling Series-I and 95.90 ha of P.B.I in Felling Series-II was felled, whereas 49.37 ha area of P.B.IV in Felling Series-I was felled. The remaining prescribed area was not felled perhaps due to the ban on green fellings. From the table it is clear that yield in yield in P.B.I and P.B.IV of Felling Series-I & II is in deficit whereas in P.B.II of Felling Series-I and in Felling Series-III, it is in excess. The deficit in yield is due to the ban on felling of green trees. The excess yield in Felling Series-III and

P.B. II of Felling Series-I is on account of the removal of salvage in these areas and non-prescription in working plan. Table 1.7.3 gives regeneration position of P.B. I areas felled during the plan period under revision:

**Table: 1.7.3. Table showing Regeneration Status.**

Status of regeneration.	Felling Series- I		Felling Series- II	
	Area (ha.)	% age of total.	Area (ha.)	% age of total.
1	2	3	4	5
Advance growth	-	-	-	-
Completely regenerated.	9.00	67.66	32.55	67.04
Moderately regenerated.	2.00	14.98	10.00	20.59
Poorly regenerated.	2.35	17.60	6.00	12.35
Un-culturable blanks.	-	-	-	-
Total.	13.35	100.24	48.55	99.98

A comparison of the above regeneration with that at the beginning of the plan is as under in Table: 1.7.4.

**Table: 1.7.4. Table showing comparison of Regeneration Status**

Status of regeneration.	Percentage of total area (%)			
	Commencement of Plan.		End of Plan.	
	F.S.-I	F.S.-II	F.S.-I	F.S.-II
1	2	3	4	5
Advance growth	10.2	0.63	-	-
Completely regenerated.	65.50	37.37	67.66	67.04
Moderately regenerated.	16.90	5.21	14.98	20.69
Poorly regenerated.	7.40	53.06	17.60	12.35
Un-culturable blanks.	-	3.73	-	-

There is a definite improvement in the progress of regeneration in both the Felling Series, moreover, in majority of the areas seeding fellings were with held due to ban on green felling, no regeneration operations could be under taken in these areas.

**1.7.9.2. THE BAN OAK WORKING CIRCLE:** - All pure or nearly pure ban oak forests were allotted to this working circle. Apart from the forests (D.P.F's) included in the Oak Shelterwood Working Circle of Malhotra's Plan, large areas of U.P.F's and U.F's having nearly pure ban crop were transferred from Protection Working Circle for better care and intensive management. The total area of this working circle was 4109.72 ha. and the forests are generally under-stocked and distribution of age classes far from normal. The forests near habitation were badly lopped. The crop was mainly middle aged to mature and deficient in younger age classes. All areas had been stocked mapped 1:15,000 scale maps. Two Felling

Series viz. Depot Felling Series (Felling Series-I) comprising of those Delimited Protected Forests which had been under regular management since Mohan's Plan (1931) under Shelterwood System and Preservation Felling Series (Felling Series-II) comprising of remaining Delimited Protected Forests and Un-delimited Protected and Un-classed Forests. Total enumeration of ban oak and some other broad-leaved-species were carried out in 10 cm. diameter classes down to 10 cm. d.b.h. no enumeration in Preservation Felling Series was done.

The special objects of management were, to protect and preserve these forests, to improve the stocking of ban crop in poorly or under-stocked areas and to meet the local demands of the right-holders and other for fuel, charcoal, fodder and grazing etc. The forests were to be managed under Punjab Shelter wood System. The regeneration was to be obtained by artificial means and coppice shoots were also to be tended. Ban oak was to be favoured through both, natural and artificial regeneration. Forests under Felling Series-II were to remain under protection. Culturable blanks and areas having density 0.3 were to be closed and planted with ban oak. A rotation of 120 years was adopted and was divided into four periodic blocks of 30 years each. Allotment to all four periodic blocks had been made. The yield was of two types, main yield from P.B. I by seeding felling and intermediate yield from other periodic blocks. The annual yield from Depot Felling Series, P.B. I was calculated as 750 cum. equivalent to 1250 Qtls Charcoal. In view of increasing demands of right-holders and nearly total ban on felling of oaks except for certain purposes, annual yield of 800 Qtls of charcoal equivalent was prescribed. No yield was prescribed from P.B.IV, III and II. Out of 176.42 ha area allotted to P.B. I, an area of 80.69 ha was prescribed for felling during the plan period for which sequence of felling was prescribed in para 88. No sequence of felling was prescribed for P.B. IV, III and P.B. II areas.

The position of yield in each Periodic Block Felling Series wise as on 31.3.2010 is as under in Table: 1.7.2.

**Table: 1.7.2. Position of Yield as on 31.3.2010**

<b>Sr. No.</b>	<b>Felling Series.</b>	<b>Periodic Block.</b>	<b>Excess / Deficit (cum.)</b>
1	Felling Series-I	PB-I	(-) 13015.478
		PB-II	(+) 107.546
		PB-III	(+) 441.502
		PB-IV	(+) 249.652
2	Felling Series-II		(+) 639.031

Since there is blanket ban on green felling, therefore, total deficit removal have accumulated to 13015.478 cum. The removal is on the lower side due to Govt. policy of ban on green felling. In other periodic blocks removal is excess as no yield and sequence of felling and yield was prescribed, whereas removal from these periodic blocks is mainly of chil and other broad-leaved species due to salvage marking as well as free grant.

**1.7.9.3. THE PLANTATION WORKING CIRCLE:** - This working circle comprised of young plantations, blanks and areas, which are under-stocked or stocked with miscellaneous scrub species. A total area of 11,327.07 ha. was allotted to this working circle. In all categories of forests three plantation series were constituted; namely, (i) Rotational Closure Plantation Series (Plantation Series-I) comprising Delimited Protected Forests. (ii) Voluntary Closure Plantation Series (Plantation Series-II) comprising of Un-delimited Protected Forests. (iii) C.F.S. Plantation Series (Plantation Series-III) comprising forests under the control of Co-operative Forest Societies. The special objects of management were to nurse the young plantations and natural young growth under a systematic regime of cleaning and thinning. To restock the existing blanks and areas under useless scrub growth with species of higher utility and economic value to meet the requirement of local population for fuel, fodder, fruits and small timber etc. Stock maps were prepared on 4"=1 mile (1:15,840) scale. The forests are generally variable in age with preponderance of middle-aged trees. No enumerations were carried out in this working circle.

The scrub forests were to be managed under Modified Clear Felling system with artificial regeneration. About 30 to 40 trees per ha well distributed over the area were to be retained as standard for seed, shade, and to meet the demands of the right-holders. In other areas species of high economic value were raised according to the suitability of site. The control of yield was by area. The areas under Plantation Series-I only were prescribed for felling. In this Plantation Series an area of 190.45 ha was prescribed for felling during the plan period vide para 102, but due to ban on green felling only 9.71 ha. was felled when ban relaxed. For Plantation Series II and III no sequence of felling was prescribed keeping in view the uncertainty of availability in the closure of these areas. In Plantation Series-I 168.22 ha. area was prescribed vide para 103.1 for planting from 1986-87 to 1990-91 which was almost taken up during the plan period. No planting programme was prescribed for Plantation Series II and III, due to the uncertainty of closures.

**1.7.9.4. THE PROTECTION WORKING CIRCLE-** This working circle comprised of all classes of forests of fir, spruce, kail, deodar and high-level blanks (mostly unculturable) excluding the compact areas under alpine pastures. The total area of this working circle was 85,510.26 ha. The entire area has been stock mapped on 4"=1 mile (1:15,840) scale. About 73.5% area lies above the tree line and hence blank. The average densities of all the forests were taken as 0.4. No enumerations were carried out. However, for assessing the growing stock of coniferous species, measurement of basal area / ha. with Relescope were taken at 3-4 randomly selected points in each compartment. Only one Felling Series was kept for the whole working circle.

Protection and preservation were the essentials of management of the forests in this circle. Other objects of management were to protect the hillsides denudation and erosion by preserving the existing forests and enhancing the

forest cover wherever feasible. To improve, in quality and density, to protect from indiscriminate felling of these forests and in consistent with these, to meet the demands of right-holders for timber and other forest produce. No definite silvicultural system was prescribed. These forests were just to be preserved and protected. Felling of trees to meet the demands of right-holders was allowed and marking was to be done on the principals of selection system. No yield was prescribed from this working circle. Deviation statement up to 31.3.2010 shows (+) 54066.385 cum removals from this working circle. This excess removal is only on account of salvage and to meet the legitimate requirements of local right-holders. Sowing and planting of culturable blanks and other poorly stocked areas with valuable species was to be done to restock the area. The sequence of planting and sowing was prescribed in para 118.1 for Delimited Protected Forests only. No such sequence of planting was laid down for Un-delimited and un-classed Forests. However, it was suggested in para 118.2 that at least 350 ha. area was to be tackled annually to get 5000 ha. of blank areas suitably restocked in the next fifteen years. Tending operations for the existing plantations were also suggested. But due to shortage of funds planting programme was not followed strictly. Similarly, tending operations of existing plantations were also not attended.

**1.7.9.5. THE ALPINE PASTURE IMPROVEMENT WORKING CIRCLE:** - this working circle was comprised of forests / compartments having large compact chunks of alpine pasture mainly in Chhota and Bara-Bhangal. An area of 30,490.93 ha had been allotted to this working circle, which falls in Uhl Range and was Un-delimited Protected Forests. The special object of management was to meet the legitimate requirements for grazing and fodder of right-holders and other concessionists and to improve the productivity and quality of these pastures in order to ensure continuous supply of nutritious forage. The entire area had been stock-mapped on 1:15,840 scales. No enumeration / assessment of forage production carried out. Since all these pastures falls in Un-delimited Protected Forests, rotational closure was difficult hence not suggested.

The measures suggested for improvement of these pastures were removal of weeds, application of fertilizers, rotational grazing and introduction of exotic grasses. To control the overgrazing and for preservation of these pastures, misc. regulations were suggested, which included restriction on grazing rights, introduction of better breed sheep and goats, incentives for reduction of animals, strict enforcement of existing grazing rules and raising the existing grazing fee as disincentive. These measures to treat these pastures have not been taken up during the plan period primarily due to the financial reasons. Also the regulatory measures such as improvement of cattle stock were not backed by sound cattle improvement plan, by the Forest Department for want of such provision in the budget. The systematic introduction of legumes, short rotational closures, enhancement of grazing fee were also not attempted perhaps due to administrative, financial and technical constraints.

**1.7.9.6. THE AVENUE WORKING CIRCLE:** - This working circle comprised of the strips along the State Highway and Pathankot - Joginder Nagar railway line passing through Palampur Forest Division. Total area of this working circle was calculated from past record, which was 397.27 ha. Most of these strips were devoid of any vegetation except few patches of Poplar plantations. However, young to mature trees of mango, shisham, jamun, arjan, semal, mulberry, salix and chil etc. were found occurring sporadically in scattered patches. The special object of managements was to enhance aesthetic beauty and economic importance, enhance productive capacity of these areas, to provide shade and shelter and to remove dead, dying and uprooted trees.

No silvicultural system was prescribed. The blanks were to be planted with tree species suited to the site. Salvage removals were permitted. The existing poplar plantations were to be protected and cared. No definite plantation programme and sequence of felling was prescribed. Due to various restrictions imposed by the Railway Board and widening of roads, nothing concrete has been done in this working circle.

#### **1.7.10. MISCELLANEOUS REGULATIONS: -**

**1.7.10.1. BOUNDARIES:** - The boundaries of forests were checked and maintained partly as per quadrennial given in the appendix-VI. The boundary registers of the Delimited Protected Forests maintained in the Range Offices, but not shown to the Working Plan staff. With the start of Forest Settlement operations for converting U.P.F.'s into D.P.F.'s since 1994-95, 1607 boundary pillars have been constructed at a total cost of Rs. 4,00,000/ only.

**1.7.10.2. FIRE PROTECTION:** - The existing fire lines were cleared and maintained according to the availability of budget. Because no seeding fellings were carried out, therefore, hardly any control burning done in these areas. The year wise area burnt as per availability of budget is given under in Table: 1.7.3.

**Table: 1.7.3. Detail of forest area burnt.**

<b>Sr. No.</b>	<b>Year</b>	<b>Area burnt in ha.</b>
<b>1</b>	<b>2</b>	<b>3</b>
1	1980-81	395.55
2	1981-82	392.68
3	1982-83	0.00
4	1983-84	0.00
5	1984-85	2,317.99

6	1985-86	221.50
7	1986-87	28.17
8	1987-88	2.00
9	1988-89	1,138.83
10	1989-90	0.00
11	1990-91	5.00
12	1991-92	242.50
13	1992-93	213.04
14	1993-94	53.80
15	1994-95	123.50
16	1995-96	1164.17
17	1996-97	13.75
18	1997-98	11.39
19	1998-99	123.50
20	1999-00	1030.52
21	2000-01	Nil
22	2001-02	Nil
23	2002-03	224.50
25	2003-04	147.25
26	2004-05	81.00
27	2005-06	20.05
28	2006-07	187.32
29	2007-08	205.25
29	2008-09	140.29
20	2009-10	598.86

Source: - Palampur Forest Division.

**1.7.10.3. BUILDINGS, BRIDLE PATHS AND BRIDGES:** - A good number of buildings have been constructed during the plan period. The list of buildings, B-paths and bridges constructed year wise is given under in Table: 1.7.4. and 1.7.5.

**Table: 1.7.4.Detail of buildings constructed**

Sr.No.	Year	Type of building	Place of construction
1	2	3	4
1	1981-82	(i) Fgd. Hut	Chobin
		(ii) Store room	Palampur
2	1982-83	(i) Fgd. Hut	Sansal
3	1983-84	(i) Fgd. Hut	Ram Nagar
		(ii) Inspection Hut.	Balakrupi
4	1985-86	(i) Completion of Fgd. Hut.	Kosri
5	1986-87	(i) Completion of Inspection Hut	Kosri
		(ii) Completion of Inspection Hut	Sukeri
		(iii) Completion of seed store.	Baijnath
6	1987-88	(i) Completion of office cum-residence	Jainsinghpur
		(ii) Completion of Fgd. Hut.	Dramman
7	1988-89	(i) Completion of B.O. residence.	Thural (Mundhi)
		(ii) Completion of Type III residence	Palampur
		(iii) Completion of Fgd. Hut.	Khajoornu
		(iv) Completion of Fgd. Hut.	Droh
		(v) Completion of Fgd. Hut.	Jaisinghpur
8	1989-90	(i) Completion of Range office-cum-residence.	Droh
9	1991-92	(i) Block officer's residence.	Droh
		(ii) Fgd. Hut	Lahat
10	1992-93	(i) Fgd. Hut.	Sansal
		(ii) Range office -cum-residence.	Dheera
11	1993-94	(i) Type-IV residence	Palampur
		(ii) Block officer's residence.	Chadhiar
		(iii) Fgd. Hut.	Panchrukhi
12	1994-95	(i) Range office-cum-residence.	Baijnath
		(ii) Forest Rest House	Jaind
		(iii) Range Rest Room	Sansal
		(iv) Fgd. Hut	Dharer



		(v) Addition and alteration of Inspection Hut	Chobin
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Source: - Palampur Forest Division

**Table: 1.7.5. Detail of Bridle Paths and Bridges**

Sr. No.	Year	Name Bridle Path / Bridge	Length
1	2	3	4
1	1982-83	(i) Construction of Deol-Tatwani B/Path.	8.58 km.
2	1983-84	(i) Construction of Jhumra-Thangehar B/Path.	1.05 km.
		(ii) Construction of Ramnagar-Khungnoo to Jakh Bawa B/Path	4.00 km.
		(iii) Construction of Bander Boru Ashapuri B/Path	5.04 km.
3	1984-85	(i) Construction of Lohri-Jhamrella B/Path	5.30 km.
4	1986-87	(i) Completion of Mule Path from Gharchandi to Mahli	3.08 km.
		(ii) Completion of Mule Path from Bhauri to Gharchandi.	4.04 km.
5	1988-89	(i) Completion of B/Path from Dudan Bahli to Kachhehra.	1.00 km.
		(i) Construction of B/Path from Baba Kathak to Gujrehra.	0.700 Km.
		(iii) Completion of B/Path from Binli khad to Gujrehra.	1.20 km.
		(iv) Completion of B/Path from Bachhal to Gawal bridge.	

Source: - Palampur Forest Division.

The repair of buildings, especially of those situated in remote areas and B/paths continued to suffer for want of sufficient funds.

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## CHAPTER – VIII

### STATISTICS OF GROWTH AND YIELD

**1.8.1. GENERAL:** - From the economic point of view Chil is the important conifer species of this division followed by Deodar, Kail, Spruce and Fir. The average quality of chil in this division conforms to F.R.I. III quality. The old and mature crop of age over hundred years conform to quality III and occasionally fall below that, young crop touching II / III quality. In broadleaved species Ban has edge over other species on account of charcoal making followed by misc. scrub vegetation. Proportion of khair trees in Govt. forests is almost negligible, however substantial number of khair trees are present on private land especially in Droh range and Panaper block of Palampur range.

#### 1.8.2. GROWTH AND YIELD DATA:

**1.8.2.1. CHIL: VOLUME TABLE:** - The chil volume and yield tables published by the F.R.I. Dehradun are generally applicable to this tract. Chil crop in this division is mainly of site quality III. Local volume tables, including the stem-timber and stem-small wood, derived by R.A. Singh after collecting necessary height and diameter data of about 50 trees in each diameter class from the forests randomly distributed shall be made use of and is tabulated in Table 1.8.1.

**Table: 1.8.1. Local Volume Table (Stem Timber and Stem Small Wood)**

Diameter Class (cm.)	Class.	Volume (Cubic meters)
1	2	3
10-20	V	0.05
20-30	IV	0.23
30-40	III	0.65
40-50	IIA	1.36
50-60	IIB	2.35
60-70	IA	3.62
70-80	IB	5.20
80-90	IC	5.20
90 & above.	ID	5.20

The above table shall be applicable for all practical purposes. The volume tables as compiled by F.R.I. for various classes and adopted in the Plan under revision shall be made use of, therefore reproduced here under for ready reference in Table 1.8.2.

**Table: 1.8.2. Volume Table For Various Height Classes.**

Diameter Class (cm.)	Class.	Volume (cubic meters) Stem timber & stem small wood.		
		HEIGHT-CLASSES.		
		34.75m. to 42.06m.	27.74m. to 34.75 m.	21.95m. to 27.74 m.
1	2	3	4	5
10-20	V	0.098	0.098	0.098
20-30	IV	0.420	0.392	0.336
30-40	III	1.042	0.888	0.804
40-50	IIA	1.951	1.738	1.598
50-60	IIB	3.255	2.986	2.730
60-70	IA	5.209	4.629	4.020
70-80	IB	7.362	6.230	5.238
80-90	IC	7.362	6.230	5.238
90 & above.	ID	7.362	6.230	5.238

**1.8.2.2. DIAMETER-AGE RELATIONSHIP:** - The diameter age relationship arrived and checked by R.A. Singh in the plan under revision, has been relied upon and shall be made use of, is tabulated in table 1.8.3.

**Table 1.8.3. Diameter-Age relationship.**

Diameter over-bark (cm.)	10	15	20	25	30	35	40	45	50	55	60	65
Age (years).	30	42	52	62	72	80	92	102	104	120	135	150

**1.8.2.3. VOLUME INCREMENT PERCENTAGE:** - Volume increment percent figures for each diameter class has been relied upon from the plan under revision, will be in use and are tabulated in Table 1.8.4.

**Table 1.8.4. Volume Increment Percent.**

Diameter class (cm.)	10-20	20-30	30-40	40-50	50-60	60-70
Volume increment percentage.	6.51	3.87	3.22	1.80	1.23	0.56

**1.8.3. DEODAR, KAIL, FIR AND SPRUCE: VOLUME TABLE:** - The existing volume factors of these species as given in the Technical Order No. 11 of Punjab forest Manual, Vol. III have been adopted in the plan under revision, shall be made use of and are reproduced in Table 1.8.5.

**Table 1.8.5. Volume Table For Deodar, Kail, Fir and Spruce.**

Diameter class (cm.)	Class	Volume (cubic meters).	
		Deodar & Kail	Fir & Spruce.
1	2	3	4
10-20	V	(0.05)	(0.05)
20-30	IV	0.14	0.14
30-40	III	0.42	0.84
40-50	IIA	1.26	1.68
50-60	IIB	2.38	3.08
60-70	IA	3.50	5.07
70-80	IB	4.76	7.00
80-90	IC	6.02	8.40
90 & above.	ID	7.00	8.40

(The figures within brackets are extrapolated)

**1.8.3.1.VOLUME INCREMENT PERCENTAGE:** - The volume increment percentage of these species, as adopted in the plan under revision, shall be in uses, which are tabulated in Table 1.8.6.

**Table 1.8.6. Volume Increment Percent**

Diameter class (cm.)	Volume Increment Percentage.			
	Deodar	Kail	Spruce	Fir
1	2	3	4	5
10-20	4.27	4.72	3.64	2.75
20-30	3.52	3.81	3.08	2.34
30-40	2.82	2.92	2.56	2.08
40-50	2.27	2.47	1.97	1.69
50-60	1.82	1.80	1.54	1.30
60-70	1.56	1.67	1.21	1.13
70-80	1.27	1.24	0.95	0.91
80-90	1.14	1.20	0.83	0.73
90 & above.	0.86	0.88	0.65	0.49

**1.8.4. OAKS: VOLUME TABLE FOR BAN OAK:** - Local volume tables, derived from the general volume tables, and adopted in the plan under revision have been relied upon and shall be in use, which are tabulated in Table 1.8.7.

**Table 1.8.7. Volume Table For Ban Oak.**

<b>Diameter class (cm.)</b>	<b>Classes.</b>	<b>Volume: Stem-timber &amp; branch wood (cubic meters)</b>	<b>Fire wood (qtls) one cubic meter = 9.90 qtls.</b>	<b>Charcoal (qtls) six qtls fire wood = one qtl charcoal</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
10-20	V	0.03	0.3	0.05
20-30	IV	0.21	2.08	0.35
30-40	III	0.75	7.43	1.24
40-50	IIA	1.47	14.55	2.43
50-60	IIB	2.34	23.17	3.86
60-70	IA	3.37	33.36	5.56
70-80	IB	4.54	44.95	7.50
80-90	IC	4.54	44.95	7.50
90 & above.	ID	4.54	44.95	7.50

**1.8.5. MISCELLANEOUS BROAD-LEAVED SPECIES: VOLUME TABLE: -**

Miscellaneous broad-leaved species occurs sporadically and are utilized mainly as fuel wood. Proportion of khair trees in govt. forests is almost negligible, however, substantial number of khair trees are present on private land especially in Droh range and Panaper block of Palampur range. The current volume factors in use in the division have been relied upon and shall be in use in the revised plan. The same volume factors for miscellaneous broad-leaved species except khair are tabulated in Table 1.8.8.

**Table 1.8.8. Volume Table for Miscellaneous Broad-leaved Species (except khair)**

<b>Diameter class (cm.)</b>	<b>Class</b>	<b>Vol. (cubic meters)</b>
<b>1</b>	<b>2</b>	<b>3</b>
10-20	V	0.028
20-30	IV	0.141
30-40	III	0.566
40-50	IIA	1.132
50-60	IIB	1.132
60-70	IA	1.415
70-80	IB	1.415
80-90	IC	1.415
90 & above.	ID	1.415

M.B. Srivastava for Rajgarh Working Plan collected the diameter class wise weight of firewood and charcoal equivalent. The same is recommended for use in this Working Plan and given in Table 1.8.9.

**Table 1.8.9. Diameter classes and Firewood/Charcoal Production**

Diameter class (cm.)	Class	Volume (cubic meters)	Firewood (qtls)	Charcoal (qtls)
1	2	3	4	5
10-20	V	0.028	0.40	0.041
20-30	IV	0.141	0.75	0.077
30-40	III	0.566	2.25	0.231
40-50	IIA	1.132	4.50	0.461
50-60	IIB	1.132	6.70	0.687
60-70	IA	1.415	8.60	0.881
70-80	IB	1.415	8.60	0.881
80-90	IC	1.415	8.60	0.881
90 & above.	ID	1.415	8.60	0.881

**1.8.6.KHAIR:** - The growth data as adopted by R. Malhotra from Pande's Haldwani Working Plan has been relied upon for age, diameter and number of trees per ha. relationship, data is tabulated in Table 1.8.10.

**Table: 1.8.10.Age, Diameter and Number of Trees per Ha.**

Crop age (years)	Average dia. (cm.)	Average height (meters)	No. of trees (per ha.)	Standing vol. Stem timber per ha. (Cum.)
1	2	3	4	5
5	(3.5)	(3.3)	-	-
10	(7.6)	(6.0)	-	-
15	(11.1)	(8.5)	(583)	-
20	(13.9)	(10.9)	(514)	5.59
25	16.5	(13.1)	(445)	11.61
30	18.8	14.9	385	20.64
35	20.8	16.7	331	26.93
40	22.66	18.3	287	32.53
45	24.1	19.5	252	37.78
50	25.4	20.7	227	41.98
55	26.6	21.6	203	-
60	27.7	22.5	188	-

(The figures within brackets are extrapolated)

The age of khair trees cannot be determined from stumps. For the collection growth statistics, linear plots have to be laid in the existing plantations and periodically measured. A specific recommendation in this regard is being made in miscellaneous regulations for future.

Following Table 1.8.11 shows the average period in years taken by different diameter classes to enter into the next higher diameter class. This has been derived from the above table.

**Table: 1.8.11.Age on entering next diameter class.**

Diameter class (cm.)	Total age on entering the class (years)	Years taken.
1	2	3
25	47	14
20-25	33	11
15-20	22	8
10-15	14	

It is estimated that annual rate of mortality in passing from one diameter class to the next higher diameter class is 2%.

To show the relationship of diameter, height, standing volume, heartwood contents and yield of katha in khair, figures of Nurpur Working Plan by Nanak Chand have been adopted and are tabulated in Table 1.8.12.

**Table: 1.8.12. Dia, Height, Standing vol,Heartwood and Katha contents.**

Diameter class (cm.)	Height (meters)	Standing Volume (cum.)	Heartwood Volume (cum.)	Weight of Heartwood for Katha (Kg.)	Weight of Air dry Katha (Kg.)
1	2	3	4	5	6
10-15	8.30	0.0257	0.0122	11.20	-
15-20	10.10	0.0686	0.0310	31.60	2.5
20-25	11.80	0.1181	0.0576	50.60	5.0
25-30	12.40	0.1697	0.1096	78.70	8.0
30-35	13.40	0.2528	0.1757	128.30	14.0
35-40	13.40	0.3310	0.2406	167.70	18.0
40-45	13.40	0.4337	0.3016	197.40	23.0
45-50	13.40	0.5468	0.3898	280.10	29.0

**1.8.7. FUELWOOD OUT TURN:** - The miscellaneous broad-leaved forests are generally worked/sold by area. These forests are quite variable in density and composition of stocking. To assess per ha out-turn of fuel wood, the out-turn figures of various coppice lots worked in the past by H.P. State Forest Corporation Ltd. were collected and analyzed. The out-turn of fuel wood varies widely from forest to forest. The average out-turn comes to about 89.00 cum. per ha. Though, this figure cannot be taken as a strict yardstick, this will serve some purpose as a guide in arriving at rough estimates of fuelwood out-turn from such areas.

**1.8.8. SOME CONVERSION FACTORS:** - Data for solid volume, stacked volume and weight of fuel wood for miscellaneous broad-leaved species was collected from Palampur, Baijnath, and Panaper fuel-wood Sale Depots. The solid volume of the billets was calculated by the quarter girth formula. The results obtained are tabulated in Table 1.8.13.

**Table 1.8.13. Conversion Factors.**

<b>1</b>	<b>2</b>	<b>3</b>
(i)	Solid volume/Stacked volume	1/2
(ii)	Air-dry weight/cubic meter Solid volume.	7.20 qtls
(iii)	Air-dry weight/cubic meter Stacked volume.	3.60 qtls.

**1.8.9. ENUMERATIONS:** - Total enumeration down to 10 cm. d.b.h. in 10 cm. diameter class have been carried out for entire Chil Working Circle and Depot Felling Series of the Ban Oak Working Circle. For other species i.e. deodar, Kail, Fir, Spruce and misc. broad leaved in Protection Working Circle 5% partial enumerations by **Stratified Random Sampling** have been carried out to assess the growing stock of these species. Compartment/sub-compartments formed has been the unit for the purpose of enumerations. Four different strata on the basis of density (< 0.1, 0.1-0.3, 0.4-0.6 and 0.7-1.0) have been formed and 5% area from each stratum selected randomly and enumerated completely. Similarly in Plantation Working Circle area with fair proportion of khair and chil trees have been enumerated. Khair trees were enumerated in 5 cm. d.b.h. classes down to 10-cm. diameters at breast height. The details of enumerations for each compartment/sub-compartment have been given in **Appendix-V** and attached in respective compartment history files.

**1.8.10. QUALITY CLASSES:** -The All India Quality classes as given in F.R.I Multiple yield tables for chil, deodar, and kail have been adopted. Quality class for individual compartment/sub-compartment has been recorded in respective compartment history files. The average site quality of chil, deodar and kail is III, II/III and II respectively.

**1.8.11. DENSITY:** - The canopy density of all the compartments/sub-compartments has been assessed occularly, compared with the enumeration results where carried out and recorded in respective compartment history files.

**1.8.12. STOCK MAPS:** - The stock maps on 1:15,000 scales have been prepared for each compartment/sub-compartment, and their tracings have been attached in the respective compartment history files.

**1.8.13. REGENERATION SURVEY:** - Regeneration assessment survey for the P.B.I areas, which are under regeneration operation in Chil Shelterwood and Oak Shelterwood working have been carried out and regeneration survey maps prepared on 1:3,750 scale along with regeneration assessment report have been placed in the respective compartment history files. The definition of completely regenerated, moderately regenerated and poorly regenerated areas has been taken as under: -

- (i) FULLY REGENERATED: Poles with density 75% and above.
- (ii) MODERATELY REGENERATED: Poles with density 50 to 75% or and seedlings with density 75% and above.



- (iii) POORLY REGENERATED: Poles with density less than 50% or saplings/seedlings and recruits with density 50% to 75 %.

The abstract of regeneration has been given in **para1.7.9 (Chapter-V)**.

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## CHAPTER – IX

### ESTIMATES OF THE CAPITAL VALUE OF THE FORESTS

#### 1.9.1. Capital Value of the Land under Forests:

The estimated capital value of the forest lands based on the average annual value of banjar kadim for the year 2011, pertaining to Palampur, Baijnath and Jaisinghpur Tehsils comes to approximately Rs. 542.19/- crores. The Table 1.9.1 below gives this detail based on the category of forest land.

**Table: 1.9.1. Capital value of Forest Land**

Sr. No.	Type of Forest land	Area (ha.)	Average cost of land (Rs/ha.)	Total cost of the land (Rs.)
1	Delimited Protected Forests.	10,620.45	13,97,200/-	14,838,892,740/-
2	Un-delimited Protected Forests.	7,932.16		11,082,813,952/-
3	Un-Classed Forests.	18,077.59		25,258,008,748/-
4	Co-operative Society Forests.	2,175.31		3,039,343,132/-
	<b>Total</b>	<b>38,805.51</b>		<b>54,219,058,572/-</b>

#### 1.9.2. Capital Value of the Growing Stock:

The estimated value of the growing stock present in the forests of Palampur Forest Division is given as under in Table 1.8.2. The estimation has been done on the basis of rates fixed by the Pricing Committee for the year 2010-11.

**Table: 1.9.2. Capital Value of Growing Stock**

Sr. No.	Species	Growing Stock (m <sup>3</sup> )	Royalty (Rs./m <sup>3</sup> )	Total Value (Rs.)
1	Chil.	30,24,667.71	572/-	1,730,109,930/-
2	Deodar.	217.07	5,903/-	1,285,083/-
3	Fir/Spruce	2,56,732.46	790/-	202,818,643/-
4	Ban Oak.	10,06,710.66	326/-	328,187,675/-
5	Kharsu Oak.	5,09,005.13		165,935,672/-
6	Miscellaneous broad leave species.	39,03,448.74		1,272,524,289/-
	<b>Total</b>	<b>87,00,781.77</b>		<b>3,700,861,292/-</b>

#### 1.9.3. Capital Value of Minor or Non-wood Forest Produce:

The estimated annual income from minor or non-wood forest produce in this division is given in Table 1.9.3.

**Table: 1.9.3. Annual Value of Minor/Non-wood Forest Produce**

<b>Sr. No.</b>	<b>Minor/Non-wood Forest Produce</b>	<b>Amount (Rs.)</b>
1	Resin	32,67,500/-
2	Other NTFP.	60,000/-
	<b>Total.</b>	<b>33,27,500/-</b>

**1.9.4:** The Total capital value of the forests of this division, including value of forest land, growing stock excluding existing buildings, roads, B/paths, Inspection paths works out to the tune of **Rs. 579.23 crores.**

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## **PART – II**

### **FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED**

## CHAPTER –I

### BASIS OF PROPOSALS

**2.1.1.NATIONAL FOREST POLICY 1952:** - The National Policy of India, as notified vide Government of India No.

13-1/52-p dated 12th May 1952, was based on the following paramount needs:

- (i) The need for evolving a system of balanced and complementary land use, under which each type of land is allotted to that form of use under which it would produce the most and deteriorate the least.
- (ii) The need for checking:
  - a) Denudation in mountainous regions on which depends the perennial water supply of river systems whose basin constitute the fertile core of the country.
  - b) The erosion progressing along the tree less banks of the great rivers leading to ravine formation and on vast stretches of undulating waste lands depriving the adjoining fields of the fertility.
  - c) The invasion of sea sands on coastal tracts, and the shifting of sand dunes more particularly in the Rajputana desert.
- (iii) The need for establishing tree lands wherever possible for the amelioration of physical and climatic conditions promoting the general well being of the people.
- (iv) The need for ensuring progressively increasing supplies of grass for cattle, small wood for agricultural implements and in particular of firewood and to get increased quantity of cattle dung for manure to step up food production.
- (v) The need for sustained supply of timber and other forest produce required for defence, communication and industry.
- (vi) The need for the realization of maximum annual revenue in perpetuity consistent with the fulfillment of the needs enumerated above. To fulfill the aforesaid needs, the following broad principles have been defined in the National Forest Policy 1952.
  - a) To ensure the full protective influence of the forests on the soil, water regime and the physical and climatic factors of the locality.
  - b) To meet the domestic and agricultural requirements of the local population without subordination of the national interest or the interests of future generations.

- c) To combat the indiscriminate extension of agriculture over the forestlands.
- d) To regulate and control grazing.
- e) To conserve forest resources in perpetuity.
- f) To provide protection to the wild life.
- g) To instill in people a sense of co-operation for maintaining and developing the forests.

**2.1.2. NATIONAL FOREST POLICY OF 1988:** - The Forest Policy of 1952 was revised in 1988. The principal aim of the new policy is maintenance of environmental stability and ecological balance through preserving the natural forests. Derivation of direct economic benefit has been subordinated to this principal aim. The policy, for the first time, has given emphasis to the involvement of people, including women, in the protection and development of forests. The salient features of the Forest Policy of 1988 are:

- (i) Setting of a national goal to have a minimum of one third of the total land area of the country under forest or tree cover.
- (ii) Initiating need-based and time-bound programme for afforestation and tree planting on all degraded and denuded lands with emphasison participatory forestry and common property management.
- (iii) Increasing productivity of forests through scientific management, based on management plans to be approved by the Government.
- (iv) Rights and concessions of the rural people, including that of grazing, to be in accordance with the carrying capacity of the forests; the rights and concessions enjoyed by the tribal and other poor people living within and around forest to be fully protected; minor forest produce and construction timber to be the first charge on forest produce.
- (v) Greater emphasis on forest protection and wild life conservation in all management plans.
- (vi) Strengthening of forest extension, forestry education and research.
- (vii) Supply of forests produce to industries at concessional prices to cease; no forest based enterprise, except at the cottage level, to be permitted in future unless it has been first cleared with regard to assured availability of forest produce; forest based enterprises to raise their own material requirement by establishing direct relationship with individual farmers;

- (viii) Creating a massive people's movement with the involvement of women for achieving objectives of the policy.

**2.1.3. HIMACHAL FOREST POLICY:** - Himachal Pradesh Government has formulated a Forest Policy for the Pradesh vide No. Fts (8)17-5/10 dated 3rd September 1980. Important features of this policy are as under:

- (i) To have 50% of the geographical area of the State under forest by 2000 AD and to raise this percentage to 60% ultimately.
- (ii) Felling to be carried strictly in accordance with the prescriptions of sanctioned Working Plans and all kinds of removals from the forests to be counted against the prescribed yield.
- (iii) Felling to be followed by regeneration.
- (iv) No felling up to 30 m on either side of the roads.
- (v) All forest areas to be properly demarcated.
- (vi) Forests and Revenue Settlements to be taken up simultaneously and the right to be defined and regulated by an Act of Legislation.
- (vii) The requirement of local right-holders to be met with judiciously keeping in view the conditions of forests.
- (viii) There being hardly any scope for further extension of agriculture, the people should be encouraged to adopt some alternative professions.
- (ix) Transfer of areas under reserved, demarcated protected forests and plantations for non-forestry purposes to be totally banned.
- (x) Management of water sheds to be given due importance.
- (xi) The methodology of planting and standards of protection to be improved to reduce mortality percentage.
- (xii) The vast blank stretches in the productive waste lands to be afforested under Social Forestry Programme with appropriate involvement and cooperation of the people especially youth and school children.
- (xii) Planting of fast growing fuel and fodder species to be preferred near habitations to meet the requirements of the local people.
- (xiii) Steps to be taken to reduce cattle population rationally, fixing norms of grazing under comprehensive legislation.



- (xiv) To promote tourism along with improvement of forest vegetation.
- (xv) Shooting of big and small game should be banned in the Pradesh for the development of Wild Life. Game sanctuaries should be established and properly managed all over the State.
- (xvi) No lease for the extraction of minerals to be granted without the prior consent of Forest Department.
- (xvii) Research facilities to be created in the Forest Department to solve problems of applied nature.

**2.1.4. OBJECTS OF MANAGEMENT:** - In a hilly state like Himachal Pradesh forests are very intimately connected with human life. They not only meet the day-to-day requirement of timber, fuel wood, fodder etc. of the local population and their livestock, but also play a key role in the maintenance of pure and salubrious environment, protection of hill slopes and regulation of water supply in the rivers and streams. The fertility of Kangra Valley in particular, is primarily dependent on the flow of water in its numerous streams and rivulets, which, in turn, depends upon the forest-cover on its slopes. The general objects of management of these forests, therefore shall be as under:-

- (i) To preserve hillside against denudation and erosion so as to ensure an equitable flow of water in the streams and rivers that originate from these hills.
- (ii) To provide for the bonfire domestic and agricultural requirements of the local people for timber, fuel, charcoal, fodder, grass and grazing subject to the silvicultural availability.
- (iii) To seek active people participation in the management of forests in the areas nearer to habitation on the principles of joint participatory forests management.
- (iv) To conserve, sustain, protect and improve the quality and stocking of the existing forests and to induce gradually conditions as near to normal as possible.
- (v) To replace the less valuable species by more valuable tree species suitable to the locality through artificial means.
- (vi) To improve the existing high level pastures by introducing high nutritive value grasses in order to meet the ever-increasing requirements of grazing by local and nomadic grazers.
- (vii) To increase the productivity of blank areas, blanks within wooded forests and degraded/under stocked less valuable misc. scrub forests by massive need based programme of forestation and tree planting with particular emphasis on fuel wood, fodder and small timber.

- (viii) To identify fauna which is getting extinct or dwindling fast in numbers and suggest measures aiming at preservation/rehabilitation of natural habitat and gene pool.
- (ix) Consistent with above, to obtain the maximum possible sustained yield of various forest products to cater to the local and national requirements.

**2.1.5. METHODS OF TREATMENT TO BE ADOPTED:** - Due emphasis shall have to be given to site specific species rather than trying economically important species everywhere. Even local shrubs and grasses shall have to be emphasized in many cases for meeting fuel and fodder requirement and checking soil erosion. Mixture of species is to be preferred to monoculture. Keeping in view the general objects of management outlined above the forests will be treated/managed under the following working circles: -

1. The Chill Working Circle.
2. The Ban Oak Working Circle.
3. The Protection Working Circle.
4. The Plantation Working Circle.
5. Grazing (Overlapping) Working Circle.
6. The Wildlife Management (Overlapping) Working Circle.
7. The Joint Forest Management (Overlapping) Working Circle.
8. NTFP Management (Overlapping) Working Circle.
9. Forest Protection (Overlapping) Working Circle.

**2.1.6. THE CHIL WORKING CIRCLE:** - This working circle comprises of all such forests where chil is found either pure or in fair proportion and are considered suitable for application of the system of concentrated regeneration fellings. All the forests / compartments allotted to this working circle in R.A. Singh's Plan have been included as such in this plan. In addition, the established chil plantations of 2.5 meters in height and over, at present in plantation working circle have also been allotted to this circle. These forests are mainly confined to Baijnath, Palampur and Droh Ranges. Irregular Punjab Shelter-wood System has been adopted. Three Felling Series have been constituted keeping in view the legal status of forests with regard to their closures. These felling series are (i) Rotational Closure Felling Series or Felling Series-I and comprises of Delimited Protected Forests. (ii) Voluntary Closure Felling Series or Felling Series-II and comprises of Un-delimited Protected and Un-classed Forests. (iii) Co-operative Forest Societies Felling Series or Felling Series-III includes the Co-operative Societies Forests. Regeneration will be obtained by natural means supplemented with artificial planting. Distinct PB's are allotted as per crop condition.

**2.1.7. THE BAN-OAK WORKING CIRCLE:** - This working circle includes all pure Ban-oak forests or nearly pure Ban-oak forests and is mainly confined to Baijnath and Palampur Ranges. There are only five Delimited Protected Forests having pure Ban-oak crop; rest being Un-classed Forests. Although there is complete ban on felling of oaks, and keeping in view the policy of preservation of oak forests of the state; two felling series, viz. (I) Depot Felling Series and (ii) Preservation Felling Series have been constituted. Due to complete ban on felling of Ban oaks, Depot Felling Series is of academic interest because forest areas under this felling series are under regular management since Mohan's Plan. These will be worked under the "Punjab Shelter wood System" for academic interest only. The main object is to preserve and improve these forests. Pole crop of vigorous growth found singly or in patches will be retained as part of future crop. The forests of Preservation Felling Series will remain under protection.

**2.1.8. THE PROTECTION WORKING CIRCLE:** - This working circle comprises of all forests of Spruce, Fir, Kharsu oak, Kail, Deodar and few scrub forests situated on precipitous slopes and in the catchment of Beas river. This also includes all high-level unculturable blanks. The forests allotted to this circle are protection forests in true sense. Almost the entire area of this circle falls in Un-delimited Protected and Un-classed Forests, with a very limited part in Delimited Protected Forests. These forests are burdened with various rights and are grazed beyond their carrying capacity. In view of their legal status, closures are a major problem.

The forests allotted to this working circle are situated on difficult, precipitous and erodable slopes and form the head-waters of streams such as Binu (Binwa), Neugal and Ban Ganga, on which a number of hydro-electric power projects have been constructed. The object of management is, therefore, mainly protection, preservation and improvement of these areas in order to ensure continuous flow of water into these streams. Fellings only to meet the genuine requirement of right holders have been allowed. Closures combined with planting in cultural blanks and degraded areas i.e. density below 0.3 have been prescribed.

**2.1.9. THE PLANTATION WORKING CIRCLE:** - This working circle includes all un-established plantations raised in Delimited Protected Forests, Un-delimited Protected Forests, Un-classed Forests, Co-operative Societies Forests and other low lying forest areas which are either blank / poorly stocked i.e. density below 0.3 or carries misc. scrub growth. Such areas are mainly in Droh Range and partly in low-lying zone of Baijnath and Palampur Ranges. This circle also includes all Railway line and Roadside stripes dealt under Avenue Working Circle of R.A. Singh's Plan. The object is to raise compact plantations of suitable species to meet the requirement of local people for small timber, fuel, fodder and fruits. The roadside and railway strips will be planted with species of aesthetic importance. The areas with misc. scrub forest will be worked under "Modified Clear Felling System". In accordance with the legal status of forests, closure and administrative control four plantation series have been constituted. These are (i) Plantation Series -I (Legal

Closure Series) (ii) Plantation Series –II (Voluntary Closure Series) (iii) Plantation Series –III (CFS Plantation Series) (iv) Plantation Series –IV (Roadside Plantation Series). Plantation Series-IV has further been sub-divided into IV.a. dealing with roadside strips and IV.b. dealing with railway line strips.

**2.1.10. THE GRAZING (OVERLAPPING) WORKING CIRCLE:** - This working circle overlaps and covers all the forests of the division with an area of 38,805.51 ha in extent. It is mainly created to check, control and regulate the local and migratory grazing, to meet the legitimate requirements of the local people of the area and to further enhance the productivity of the grazing and grasslands and pastures etc. The main object of management of these areas is to improve the productivity of these pastures and quality of forage by adding fertilizers, introduction of better quality grasses and rotational closures for short periods.

**2.1.11. THE WILDLIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE:** - This is overlapping working circle and hence includes the whole area under different working circles and covers all the forests of the division. Among various fauna found in this forest division, **Leopard, Black Bear, Chakor, Ghoral, Koklas, Thar, Snow Cock, Brown Bear, Monal, Musk Deer, Chir Pheasant, Black Partridge, Peacock, Sambar, Barking Deer,** are noteworthy. A Comprehensive list of common animals and birds is, however, given with the Glossaries.

**2.1.12. THE JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE:** - This working circle overlaps all the working circles and includes all forests of the division, seriously degraded Un delimited Protected Forests, Un classed Forests, Village Common lands and land ceiling areas which needs immediate treatment through afforestation, assisted natural regeneration, pasture improvement, soil conservation etc. The main object of this working circle is to inculcate in the people / right holders a direct interest in forests, their development, protection, conservation, and to make them aware of importance of forests.

**2.1.13. NON TIMBER FOREST PRODUCE MANAGEMENT (OVERLAPPING) WORKING CIRCLE:** - This is overlapping working circle and hence includes the whole area under different working circles and covers all the forests of the division. With the thrust of forest management shifting from being ‘tree centred’ to ‘people-centred’ forests are now being viewed as a source of not only commercial timber but of valuable Non Timber forest products as well. The main object of management in this working circle is to document important NTFP species found in the division and preserve, improve the quantity and quality of NTFPs in the division on a sustainable basis.

**2.1.14. FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE:** - This is overlapping working circle and hence includes the whole area under different working circles and covers all the forests of the division. The main objective of this

working circle is to curtail the forest fire incidences, illicit felling, smuggling of forest produce and increasing encroachments on forest land.

**2.1.15. WORKING CIRCLES: THEIR AREA AND DISTRIBUTION:** - Details of areas allotted to various independent working circles, which cover the tract, is given below Table: 2.1. 1.

**Table: 2.1.1. Working circle and Range wise Area Distribution**

Range	Area in ha.				
	Chil Working Circle.	Ban-Oak Working Circle.	Protection Working Circle.	Plantation Working Circle.	Total Area.
1	2	3	4	5	6
Bajnath	1,223.40	258.97	11,452.44	1,641.70	14,576.51
Droh	498.58	-	819.99	4,504.72	5,823.29
Palampur	2,254.62	3,250.31	9,566.36	3,334.42	18,405.71
<b>Total.</b>	<b>3,976.60</b>	<b>3,509.28</b>	<b>21,838.79</b>	<b>9,480.84</b>	<b>38,805.51</b>

**2.1.16. FELLING SERIES / PLANTATION SERIES:** - The constitution of these has been described in the respective working circle.

**2.1.17. BLOCKS AND COMPARTMENTS:** - These generally remain the same as in the working plan under revision. However, in certain cases some new compartments have been formed in order to facilitate concentrated working under shelter wood system and notification of new D.P.F.'s. The changes made are tabulated as below 2.1.2.

**Table: 2.1.2.New Compartment formations**

Sl. No.	Range	Old No. of Fts.	Comptt.	Area ha	New No. of forest	Comptt.	Area
1	2	3	4	5	6	7	8
1	Palampur	P.19P. Lahla	3b(i)	48.96	P.19P. Lahla	3b(ii)	48.96
	-do-	-do-	3b(ii)	19.42	-do-	3d(i)	19.42
	-do-	-do-	3d(i)	21.04	-do-	3b(i)	21.04
	-do-	U.P.7 P. Dehli	Whole	29.54	P.59 P. Dehli	Whole	26.62
	-do-	U.P.4 P. Kharti	Whole	55.43	P.60 P. Kharti	Whole	56.78
	-do-	U.P. 5 P. Barsar	Whole	33.18	P.61 P. Barsar	Whole	21.30
	-do-	U.P.6 P. Ardi	Whole	38.85	P.62 P. Ardi	Whole	27.73
	-do-	U.P.1 P. Dadh-Jhikli	Whole	10.52	P.58 P. Dadh-Jhikli	Whole	11.72
	-do-	U.P. 11 P. Rakh	Whole	76.48	P.68 P. Rakh	Whole	30.27
	-do-	U.P.12 P. Ban-Bharthari	Whole	11.74	P.63 P. Ban-Bharthari	Whole	9.99
	-do-	U.P.21 P. Ghesanpat	Whole	6.07	P.67 P. Ghesanpat	Whole	22.53

1	2	3	4	5	6	7	8
	-do-	U.P.15 P. Drang	Whole	100.76	P.55 P. Drang	Whole	19.25
	-do-	-do-	-do-	-do-	P.56 P. Cheli	Whole	31.82
	-do-	-do-	-do-	-do-	P.57 P. Dholta	Whole	15.34
	-do-	U.P.114 P. Dheera I	-do-	19.02	P.54 P. Dheera	Whole	30.85
	-do-	U.P.25 P. Kandbari	-do-	27.52	P.71 P. Nanahar	Whole	21.79
	-do-	-do-	-do-	-do-	P.70 P. Ghorat	Whole	21.28
	-do-	U.P.23 P. Differpatt	Whole	29.54	P.69 P. Differpatt	Whole	24.79
	-do-	U.P.17 P. Asanpatt	Whole	22.25	P.65 P. Asanpatt-I	Whole	13.81
	-do-	-do-	-do-	-do-	P.64 P. Asanpatt-II	Whole	7.16
	-do-	U.P.18 P. Brahmtheru	Whole	14.97	P.66 P. Brahmtheru	Whole	8.42
<b>2</b>	<b>Bajjnath.</b>	U.P.46 B. Bhet-Buhli	1 &2	39.65 &1.62	U.P.46 B. Bhet-Buhli	1	41.27
	-do-	U.P.41 P. Sansai-I	Whole	154.57	P.75 B. Chhamb	Whole	70.23
	-do-	U.P.42 P. Sansai-II	Whole	322.07	P.76 B. Tain	Whole	77.61
	-do-	-do-	-do-	-do-	P.77 B. Anirudh	Whole	21.14
	-do-	U.P.125 B. Sansal	Whole	352.85	P.72 B. Mandher-Kalan	Whole	62.62
	-do-	-do-	-do-	-do-	P.72 B. Mandher-Khurd	Whole	35.12
	-do-	U.P.34 B. Jamrella	Whole	15.38	P.74 B. Jamrella	Whole	12.26
<b>3</b>	<b>Daroh.</b>	U.P.43 P. Jaisinghpur-II	558.81	Whole	P.45 P. Balla	Whole	9.88
	-do-	-do-	-do-	-do-	P.46 P. Maila	Whole	42.03
	-do-	-do-	-do-	-do-	P.47 P. Bajot	Whole	9.84
	-do-	-do-	-do-	-do-	P.48 P. Traffer	Whole	22.19
	-do-	-do-	-do-	-do-	P.49 P. Harsi	Whole	38.64
	-do-	-do-	-do-	-do-	P.50 P. Molag	Whole	20.34
	-do-	U.P.96 P. Chogan	Whole	19.02	P.53 P. Chogan-I	Whole	18.77
	-do-	U.P.94 P. Devi	Whole	46.13	P.52 P. Chogan-II	Whole	6.71
	-do-	U.P.87 P. Fasta	Whole	25.90	P.51 P. Devi	Whole	23.16

The system of numbering of forests introduced by Mohan and followed in the working plan under revision is well understood. The same has been adopted with change in suffix as per jurisdiction of forests falling in respective tehsil. The letter P, U, P, and U when used as prefixed denotes De-limited Protected, Un-delimited Protected and Un-classed Forests respectively. The letters B, P and J when used as suffixed denotes Bajjnath, Palampur and Jaisinghpur tehsil respectively. The name given in the last after the letters B, P and J, stands for the name of the forest after which the name of the village; generally the name of Mauza in case of D.P.F., s and of Tika in case U.P.F's and U.F.'s. Thus, **P.11 B. Sansal** means Delimited Protected Forest number 11 of Bajjnath Tehsil; Village Sansal; **P. 20 P. Paror** means

Delimited Protected Forest Number 20 of tehsil Palampur; Village Paror; **U.P.112 P. Naura** means Un delimited Protected Forest number 112 of Tehsil Palampur, Village Naura and **U.5 B. Deol** means Un-classed Forest number 5 of Tehsil Baijnath; and Village Deol.

In case of forests under the control of the Co-operative Forest Societies, the system of nomenclature in the working plan under revision is well understood. The same has, therefore, been adopted. Thus the letters P, U.P. U. B.M. and S when used as prefix to the compartment number denotes Delimited Protected, Un-delimited Protected, Protected Unclassed, Ban Muafi and Shamlat areas respectively. The prefixing these letters denotes the name of Society and the Tika.

**2.1.18. PERIOD OF THE PLAN:** - This plan is prepared for a period of 15 years commencing from 1st April, 2010 to 31<sup>st</sup> March, 2025. The working plan under revision expired on 31.3.1996. There were no Silvicultural fellings since then and the salvage removals made w.e.f 1996-97 to 2009-10 has been duly accounted in the Divisional Control Forms based on the prescriptions of previous Plan. The other operations like plantations under State schemes; Compensatory Afforestation; CAT Plan; control burning, repair of boundary pillars etc. were done on the basis of Annual Plan Operations. Hence, there is no problem in making the plan operative prospectively.

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## CHAPTER-II

### CHIL WORKING CIRCLE

**2.2.1. GENERAL CONSTITUTION AND CHARACTER OF THE VEGETATION:** - This working circle includes all the pure or nearly pure chil forests of the division. This largely remains much the same as the Chil Shelter wood Working Circle of the plan under revision except that a few chil bearing areas from other working circles have been included. In addition established chil plantations raised in the Un delimited Protected and Un classed Forests have been included in this working circle for regular management. This working circle also includes suitable chil areas added from newly created D.P.F.'s .The total area of the working circle is 3,978.00 ha. The following Table: 2.2.1 gives distribution of chil working circle in various ranges: -

**Table: 2.2.1. Range wise and Category wise area Distribution.**

Sr. No.	Category of Forest	Ranges			Total
		Bajnath	Daroh	Palampur	
1	2	3	4	5	6
1	D.P.F.	233.30	137.20	868.10	1,238.60
2	U.P.F.	498.00	215.70	358.00	1,071.70
3	U.F.	492.10	-	276.20	768.30
4	C.F.S.	-	145.68	753.72	899.40
	Total	1,223.40	498.58	2,256.02	3,978.00

The general character of the vegetation has already been described in para 1.2.3 of **Chapter II (Part I)**. The forests, on the whole, are under-stocked, vastly variable in density and the normal distribution of age-classes is lacking except P.B.IV and P.B. III areas of the Delimited Protected and the Co-operative Society Forests. The forests under these two periodic blocks have undergone the process of conversion to uniform during the last sixty years and position of the growing stock in these forests is quite near to the normal. The Un delimited and the Un classed forests were brought under regular management for the first time in the Malhotra's working plan. Many of these forests have generally pure, young crops raised artificially and mature trees are much in deficit.

**2.2.2. BLOCKS AND COMPARTMENT:** - The boundaries of the forest blocks remain the same as in the plan under revision. The compartments and sub-compartments also remain, for the most part, as in the previous plan except that a few sub-compartments have been formed out of existing bigger compartments to facilitate concentrated working. All the compartments and sub-compartments are distinguishable on the ground. The details of such new sub-compartments have been given in para 2.1.16.**Chapter-I (Part-II)**.



**2.2.3.FELLING SERIES:** - Keeping in view the legal status of the forests with regard to closures and their control for management, three felling series as constituted in working plan under revision have been adopted. These are as under: -

**(i) Rotational Closure Felling Series:** (hereafter referred to as Felling Series-I) comprises of the Delimited Protected Forests and is subject to the Scheme of Rotational Closures.

**(ii) Voluntary Closure Felling Series:** (hereafter referred to as Felling Series-II) includes the Un-delimited and Un-class Forests. Closure in the Un classed Forests is purely voluntary whereas in the Un delimited Forests this right, though not surrendered by the Government, is, as per the established practice, extremely difficult to exercise without the consent of people.

**(iii) Co-operative Forest Societies Felling Series:** (hereafter referred to as Felling Series III) includes the forests previously under the control of the Co-operative Forest Societies.

**2.2.4. SPECIAL OBJECTS OF THE MANAGEMENT:** -The special objects of management shall be as under: -

(i) To continue the conversion of generally irregular, chil forests to more or less regular crops.

(ii) To seek involvement of local people by adopting joint participatory forest management wherever possible.

(iii) To provide for the bonafide requirements of the right holders for constructional timber, fire wood and grazing etc.

(iv) To restock with chil, either naturally or artificially, the areas with deficient regeneration.

(v) Consistent with the above, to obtain maximum possible sustained yield of timber, pulpwood and resin.

**2.2.5. AREA AND ALLOTMENT:** - The following Table: 2.2.2 gives the area in ha. range wise and category wise of forest for each felling series allotted to different periodic blocks; the forest wise detail of allotments has been given in **Appendix-I**.

**Table: 2.2.2. Area Distribution Range, Category and Felling Series wise.**

<b>FELLING SERIES-I</b>					
<b>Range</b>	<b>P.B.I.</b>	<b>P.B.II.</b>	<b>P.B.III.</b>	<b>P.B.IV.</b>	<b>Total.</b>
Palampur.	272.56	125.86	188.61	281.07	868.10
Bajnath.	67.36	62.71	20.64	82.59	233.30
Droh.	40.87	32.77	34.00	29.56	137.20
Total.	380.79	221.34	243.25	393.22	1,238.60

**FELLING SERIES-II**

<b>Range.</b>	<b>P.B.I.</b>	<b>P.B.U.</b>	<b>P.B.IV.</b>	<b>Total.</b>
Palampur.	100.09	390.12	144.30	634.51
Bajnath.	298.24	433.11	258.75	990.10
Droh.	56.24	77.30	82.16	215.70
Total.	454.57	900.53	485.21	1,840.31

**FELLING SERIES-III**

<b>Range.</b>	<b>P.B.I.</b>	<b>P.B.II.</b>	<b>P.B.III</b>	<b>P.B.IV.</b>	<b>Total.</b>
Palampur.	137.18	234.68	186.90	194.96	753.72
Bajnath.	-	-	-	-	-
Droh.	69.19	-	17.40	59.09	145.68
Total.	206.37	234.68	204.30	254.05	899.40

**2.2.6. ANALYSIS AND VALUATION OF THE CROP:** -The crop is analyzed for different characters of vegetation as under: -

**2.2.6.1. STOCK MAPS:** -Detailed stock maps of all areas have been prepared on 1:15000 scales and filed with respective history files. These maps are not made independently for each compartment / sub-compartment but one map of the entire forest showing boundaries of various compartments/sub-compartment has been filed in the compartment history files. Chil is the main species all over in this working circle and occupies about 90 % of the area of this working circle, the rest being under miscellaneous broad-leaved species, ban-oak and culturable blanks. The detail of area under various species, range wise for each felling series is given in Table 2.2.3.

**Table: 2.2.3. Area under different Species Range and Felling Series wise**

**FELLING SERIES-I**

<b>Range.</b>	<b>Chil.</b>	<b>Ban-oak.</b>	<b>Misc. B.L.</b>	<b>C. B.</b>	<b>Total.</b>
Palampur.	811.26	-	33.60	23.24	868.10
Bajnath.	211.59	17.46	4.25	-	233.30
Droh.	118.18	-	19.02	-	137.20
Total.	1,141.03	17.46	56.87	23.24	1,238.60

**FELLING SERIES-II**

<b>Range.</b>	<b>Chil.</b>	<b>Ban-oak.</b>	<b>Misc. B.L.</b>	<b>C.B.</b>	<b>Total.</b>
Palampur.	589.78	7.29	4.23	32.90	634.20
Bajnath.	883.05	29.95	16.55	60.55	990.10
Droh.	187.87	-	-	27.83	215.70
Total.	1,660.70	37.24	20.78	121.28	1,840.00

### FELLING SERIES-III

Range.	Chil.	Misc. B.L.	C.B.	Total.
Palampur.	721.79	11.56	20.37	753.72
Bajjnath.	-	-	-	-
Droh.	127.49	7.47	10.74	145.70
Total.	849.28	19.03	31.11	899.42

**2.2.6.2. SITEQUALITY AND AGE CLASSES:** - The site quality varies from locality to locality and on the whole average quality of chil in this division is III. The site quality of each compartment/sub-compartment has been mentioned while stock mapping and describing the compartments and has been given in the respective compartment history files. In some forests e.g. P.11.B. Sansal and P.12.B. Panjala are, however, below quality III. The stands are on the whole irregular having preponderance of younger age classes. Broad age classes viz. young middle aged, mature and over mature have been distinguished and recorded in compartment history files. However, the crop in the P.B.III and P.B.IV areas is more or less uniform.

**2.2.6.3. DENSITY:** - Canopy density of each forest / compartment has been estimated ocularly and mentioned in the respective compartment history files. The overall density works out to 0.7 in Felling Series I, 0.4 in Felling Series II and 0.8 to 0.9 in Felling Series III. However, there is wide variation in the density of the forests; as low as less than 0.1.

**2.2.6.4. ENUMERATIONS:** - Total enumeration down to 10-cm. diameter Classes have been carried out in case of chil and economically important broad-leaved species for the whole working circle and appended in the respective compartment history files. The details of enumeration are given in Appendix-II. The P.B. wise abstract for each felling series is given in Table 2.2.4

**Table: 2.2.4. P.B. and Felling Series wise Abstract of Enumerations**

### FELLING SERIES-I

P.B.	Area (ha).	No. of Trees.										
		V	IV	III	IIA	IIB	IA	IB	IC	ID	Total	Volume. (Cum)
1	2	3	4	5	6	7	8	9	10	11	12	13
I	380.79	122404	44588	16933	5160	3186	2955	1188	761	359	197534	64585.29
II	221.32	70934	23074	7356	3132	2622	2041	1053	487	295	110994	40986.76
III	243.25	12951	20779	16242	7594	4358	2433	1145	344	163	66009	53951.02
IV	393.24	91126	57581	31431	9240	3747	2346	1189	725	653	198138	81442.85
Total	1238.60	297415	146022	71962	25126	13913	9775	4575	2317	1470	572575	240965.92

### FELLING SERIES II

P.B.	Area (ha).	No. of Trees.										
		V	IV	III	IIA	IIB	IA	IB	IC	ID	Total	Volume. (Cum) 13
1	2	3	4	5	6	7	8	9	10	11	12	
I	454.57	83668	17810	2857	1069	708	540	297	135	37	107121	17647.99
U	900.13	210042	57971	12499	5578	3618	2540	998	335	155	293736	64980.56
IV	485.30	115360	56646	10847	1997	651	370	160	64	23	186118	32716.70
<b>Total</b>	1840.00	409070	132427	26203	8644	4977	3450	1455	534	215	586975	115345.25

### FELLING SERIES III

P.B.	Area (ha).	No. of Trees.										
		V	IV	III	IIA	IIB	IA	IB	IC	ID	Total	Volume. (Cum) 13
1	2	3	4	5	6	7	8	9	10	11	12	
I	206.37	23237	13515	4093	1474	797	370	176	102	22	43786	13707.74
II	234.68	20183	8328	7548	4637	2387	1000	328	117	13	44541	25748.16
III	204.30	25408	21642	12804	5187	2277	695	168	31	20	68222	30630.63
IV	254.05	45564	27183	10463	2691	909	350	177	85	34	87456	23933.35
<b>Total</b>	899.40	114392	70668	34908	13989	6370	2415	849	335	89	244015	94019.88

**2.2.6.5. GROWING STOCK:** - Comparative statement of the existing growing stock, (G.S.) the normal growing-stock and the growing-stock at the beginning of the plan under revision for the corresponding periodic blocks is as below in Table 2.2.5.

**Table: 2.2.5. Felling Series and P.B. wise growing Stock.**

FELLING SERIES I				
Periodic Block.	No. of trees/ha.	Present G.S./ha. (cum)	Normal G.S./ha. (cum)	G.S./ha. at the beginning of plan.
1	2	3	4	5
I	518	169.608	234	91
II	501	185.192	198	132
III	271	221.792	169	153
IV	503	207.107	86	144
<b>Average.</b>	448	195.920	172	130

### FELLING SERIES II

Periodic Block.	No. of trees/ha.	Present G.S./ha. (cum)	Normal G.S./ha. (cum)	G.S./ha. at the beginning of plan.
1	2	3	4	5
I	236	38.823	234	41.78
U	326	72.190	118	55.39
IV	384	67.415	86	-
<b>Average.</b>	315	59.476	146	51.19

### FELLING SERIES III

Periodic Block.	No. of trees/ha.	Present G.S./ha. (cum)	Normal G.S./ha. (cum)	G.S./ha at the beginning of plan.
1	2	3	4	5
I	212	66.723	234	286
II	190	109.716	198	384
III	334	149.675	169	241
IV	344	94.269	86	184
<b>Average.</b>	270	105.095	172	274

The above figure indicates a reasonably satisfactory position of growing stock in all P B's of Felling Series-I and better in P B -III and P B - IV which implies that the process of conversion to the uniform, normal crops is proceeding on the stipulated lines. The P B -IV areas are, however overstocked on account of presence, in many cases, of the seed bearers and congestion in natural young crop. The position of growing stock in Felling Series-II has also improved over the previous plan but still under stocked as compared to normal growing stock. The position of growing stock in Felling Series - III is far from satisfactory. This is due to removal of mature and over mature trees in salvage marking as evident from enumeration figures.

**2.2.7. CURRENT ANNUAL INCREMENT:** -The Current Annual Increment for each Felling Series worked on the basis of rate of increment as given in Table 1.8.4. Chapter VIII of Part I is given in Table 2.2.6.

**Table: 2.2.6. Current Annual Increment Felling Series wise (cum).**

### FELLING SERIES-I

	DIAMETER CLASSES.									Total.
	V	IV	III	IIA	IIB	IA	IB	IC	ID	
1	2	3	4	5	6	7	8	9	10	11
No. of Trees.	297415	146022	71962	25126	13913	9775	4575	2317	1470	572575
Vol. in cum.	14870.75	33585.06	46775.30	34171.36	32695.55	35385.50	23790.00	12048.40	7644.00	240965.18
Increment Percent	6.51	3.87	3.22	1.80	1.23	0.56	0.56	0.56	0.56	
C.A.I.	968.089	1299.743	1508.248	615.078	407.941	197.596	133.224	68..051	42.806	5240.777

## FELLING SERIES-II

	DIAMETER CLASSES.									
	V	IV	III	IIA	IIB	IA	IB	IC	ID	Total.
1	2	3	4	5	6	7	8	9	10	11
No. of Trees.	409070	132427	26203	8644	4977	3450	1455	534	215	586975
Vol. in cum.	20453.50	30458.21	17031.95	11755.84	11695.95	12489.00	7566.00	2776.80	1118.00	115345.25
Increment Percent.	6.51	3.87	3.22	1.80	1.23	0.56	0.56	0.56	0.56	
CAI	1331.522	1178.732	548.430	211.608	143.860	69.938	42.369	15.550	6.260	3548.273

## FELLING SERIES-III

	DIAMETER CLASSES.									
	V	IV	III	IIA	IIB	IA	IB	IC	ID	Total.
1	2	3	4	5	6	7	8	9	10	11
No. of Trees.	114392	70668	34908	13989	6370	2415	849	335	89	244015
Vol. in cum.	5719.60	16253.64	22690.20	19025.04	14969.50	8742.30	4414.80	1742.00	452.80	94019.88
Increment Percent.	6.51	3.87	3.22	1.80	1.23	0.56	0.56	0.56	0.56	
C.A.I.	372.345	629.014	730.618	342.450	184.131	48.956	24.811	9.755	2.300	2344.383

**2.2.8. SILVICULTURAL SYSTEM:** - The silvicultural system adopted shall be the modified shelter wood system known as Punjab Shelterwoodsystem or the Indian Irregular Shelterwood system which is a modification of the Uniform System. Chil is a strong light demanding species and hence most suited to be managed under the Uniform System or modification of uniform system. This system permits retention of compact groups of well grown pole crop up to 20 cm. d.b.h. at least 0.2 ha. in extent with a density not less than 0.7 as part of the future crop and thus, certain amount of irregularity in the main crop is allowed. The marking conforms to the selection principles where topographical features of the ground inhibit concentrated felling.

Most of the forests of this division being of stable and intermediate sub-type, natural regeneration is generally profuse and sufficient. Natural regeneration supplemented by artificial means, wherever necessary, will, therefore, be relied upon.

**2.2.9. CHOICE OF SPECIES:** - Chil shall be the principal species and preferred to the miscellaneous broad-leaved species. All cultural works shall aim at encouraging chil in the forests of this working circle.

**2.2.10. ROTATION AND CONVERSION PERIOD:** - As per standard FRI yield tables the mean annual increment for Quality III chil crop from stem timber culminates at 120 years. The chil forests of this division have been worked on a rotation of 120 years in the past also and based on this fact it was estimated that

in 120 years the trees would attain a diameter of 60 cms. But a perusal of the DFRI yield tables a site quality III chil tree reaches a diameter of 50 cms. in 120 years and even at the age of 160 years the average diameter achieved is 55 cms. It can be inferred from this that even if we increase the rotation beyond 120 years this diameter of 60 cms is not likely to be attained. Hence the rotation of 120 years, in keeping with the requirements of the scheme of Rotational Closures has been adopted. At this age the crop diameter of chil, in this locality, is about 55 cm. a size suitable for conversion into sleepers and for resin extraction.

The forests of Felling Series-I are under the process of conversion to uniform since Walter's Plan. With the conversion period of 120 years, about 80 years have passed. But the pace of conversion remained slow due to one factor or other and the proportionate area could not be converted. It is envisaged that the remaining area will be converted in a period of next 80 years. The conversion period of 120 years is being retained for all the three Felling Series.

**2.2.11. REGENERATION PERIOD:** -The scheme of "Rotational Closures" is based on the closure period of 30 years. Keeping in view the periodicity of good seed years, the danger from forest fires and the growth rate of chil in the locality, this period is sufficient to obtain adequate established regeneration and, therefore regeneration period of 30 years is being adopted.

**2.2.12. REDUCTION FACTORS AND REDUCED AREAS:** - There is not much variation in the site quality of the forests. Though, density is quite variable yet as the yield is being regulated by volume and controlled by area also so, it is considered un-necessary to reduce the areas for site quality and density.

**2.2.13. DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS:** - The forests have been divided into fixed periodic blocks. Owing to the general moratorium on green felling in the Himachal Pradesh since the early 1980s, the process of conversion of irregular chil forests into regular crop came to a halt. The seeding and final fellings as prescribed in the plan under revision were not implemented. There is preponderance of class V trees which is due to the opening of canopy because of salvage and TD removals. With a rotation of 120 years and regeneration period of 30 years, there will be four periodic blocks. Definite allotment to each periodic block has been made in the case of Felling Series-I and III, whereas in Felling Series-II, only P.B.I and P.B.IV areas have been allotted, the others being grouped together as P.B. Un-allotted. Allotment to various periodic blocks is primarily in the sequence fixed by the Closure Scheme (in case of felling series-I). Due to preponderance of young age classes and irregular crop, it is not possible to identify areas specific to each P.B., yet the following broad principles have been kept in view while making the allotments: -

**P.B.-I:** - Forests comparatively mature to over mature trees, areas regenerated adequately with young crop yet not established; where blanks / interruption of crop canopy has been created due to various removals; of lower

density; with blanks having incipient regeneration and apparently degraded one have been allotted to this periodic block. Typical examples are P.27.P. Khatin 1a, P.36.P. Bajur-Gahar 1b and P.40.P Duhak 3a

**P.B.-II:** -Areas with typical P.B.II crop i.e. the crop approaching maturity or mature and having good stocking are simply un-available. The areas with comparatively better stocking of trees approaching maturity have been allotted to this working circle. As far as crop age and the crop diameter are concerned, the forests of this periodic block and P.B.-I are generally identical; they're being no appreciable distinction on these accounts.

**P.B.-III:** - The areas regenerated during Walter's and Mohan's Plans (the first regeneration period) and now having preponderance of IV and III class trees have been allotted to this periodic block. The crop is reasonably well stocked and more or less uniform in character.

**P.B.-IV:** - The forests successfully regenerated during the second period i.e. during Romesh's Plan and plan under revision have been allotted to this periodic block. In Felling Series-I, many compartments / sub-compartments still have over wood present and young crop is quite congested due to ban on green fellings. In case of Felling Series-II this periodic block primarily includes successful plantation areas mainly of seventies.

**2.2.14. DISTRIBUTION:** - Area under each periodic block of each felling Series has been given in Table: 2.2.4. in Para 2.2.6.4. With a few exceptions the areas allotted to different periodic blocks are the same as in the plan under revision. Following Table 2.2.7 gives a comparative statement of area under different periodic blocks of the previous plan and plan under revision.

**Table: 2.2.7. Comparative distribution of area under different Periodic Block**

<b>FELLING SERIES-I</b>					
	<b>Area under different P.B.'s (ha).</b>				
	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>Total</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Previous Plan.	268.27	24.23	212.46	252.92	757.88
Present Plan.	380.79	221.32	243.25	393.24	1238.60

<b>FELLING SERIES-II</b>				
	<b>Area under different P.B.'s (ha).</b>			
	<b>I</b>	<b>U</b>	<b>IV</b>	<b>Total</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Previous Plan	394.94	1148.77	-	1543.71
Present Plan	454.57	900.13	485.30	1840.00



### FELLING SERIES-III

	Area under different P.B.'s (ha).				
	I	II	III	IV	Total
1	2	3	4	5	6
Previous Plan.	135.53	161.45	191.38	209.57	697.93
Present Plan.	206.37	234.68	204.30	254.05	899.40

**2.2.15. PROVISION IN CASE OF NATURAL CALAMITIES:** - In case an area is destroyed (50% or more) due to natural calamities like fire / wind, it will be relegated to P.B.-I (seeding felling area) and will be taken up for regeneration operations and un-felled equal area from P.B.-I (seeding felling) will be relegated to concerned P.B. In these cases necessary entries will be made in concerned compartment history files.

**2.2.16. CALCULATION OF YIELD:** - The yield from this Working Circle will consist of yield from P.B. I and P.B. IV areas. The dry, fallen, uprooted, dead and damaged trees from P.B. II and P.B. III areas will be utilized for meeting the right holders demand and removed under salvage marking. Volume of these removals shall be counted against the yield of the working circle. The yield has been calculated by volume separately for all periodic blocks in all Felling Series except P.B.II and III of Felling Series I and III and P.B.U. of Felling Series II. It is because crop in these P.B. is already open and therefore no commercial fellings are prescribed here.

**2.2.16.1. YIELD FROM FELLING SERIES-I:** - The current annual increment over the entire felling series as given in para 2.2.7 and Table 2.2.6 comes to 5240.777 m<sup>3</sup>. The annual yield according to Simmon's modification of Von Mantel formula is calculated as under:

$$\text{Annual Yield } Y = \frac{2R}{R^2 - X^2} \times V$$

Where Y = Annual yield

V = Volume of growing stock measured

R = Rotation

X = Age corresponding to diameter to which the growing stock is measured.

Here X = 30

V = 2,41,604.92 m<sup>3</sup>

R = 120

$$\text{Therefore, } Y = \frac{2 \times 120 \times 241604.92}{(120)^2 - (30)^2} \text{ m}^3$$

$$Y = 4,276.407 \text{ m}^3 \text{ or say } = 4,000 \text{ m}^3$$

**2.2.16.1.1. YIELD FROM P.B. I:** - The major yield from this periodic will be realized through the seeding fellings. The seeding fellings all over the P.B I areas will have to be completed during this plan period so that these can be regenerated with the regeneration period of 30 years. As all the areas in this periodic block are new, none of these will be ready for final fellings during this plan period.

The growing stock of this Periodic Block is tabulated below in Table 2.2.8.

**Table 2.2.8. Abstract of growing stock in PB I**

	V	IV	III	IIA	IIB	IA	IB & above	Total
No.	122404	44588	16933	5160	3186	2955	2308	197534
Vol. M <sup>3</sup>	6120.20	10255.24	11006.45	7017.60	7487.10	10697.10	12001.60	64585.29

The average annual yield calculated below, using the Hufnagel's formula.

$$Y = \frac{C_1 V_1 + C_2 V_2}{P}$$

P

Where

Y = Average annual yield in m<sup>3</sup>.

C<sub>1</sub> = Constant representing the fraction of volume of trees of class IIA & above that will be available for felling i.e. 0.8

V<sub>1</sub> = Corresponding Volume of trees 40 cm dbh and above (II & above)

C<sub>2</sub> = Constant representing the fraction of volume of trees of classes III & IV, that will be available for felling, i.e. 0.2

V<sub>2</sub> = Corresponding Volume of trees of 20-40 cm dbh (class III and IV)

P = Plan period i.e 15 years.

Accordingly the average yield works out to be:

$$\begin{aligned}
 Y &= \frac{80\% \text{ of } 37203.40 + 20\% \text{ of } 21261.69}{15} \\
 &= \frac{29762.72 + 4252.33}{15} \\
 &= \frac{34015.05}{15} = 2267.67 \quad \text{or Say } 2000 \text{ m}^3
 \end{aligned}$$

Hence the annual yield from PB I areas of this working circle is **2000 m<sup>3</sup>**

**2.2.16.1.2. YIELD FROM P. B. IV:** - 393.24 ha of the area of this working circle is under the PB-IV (PB regenerated) and has good stocking of pole crop. There are a good number of I and II class trees (mother trees) standing over and mixed with the established regeneration. Most of the I class trees are out of place and are required to be removed except those standing isolated in open place, or on the peripheries of the forests or on steep slopes. It is estimated that about 80 % of I & II class trees will be available for removal. Thus the yield from this Periodic Block will be available from two sources.

**a) From final fellings i.e. trees 40 cms and above in d.b.h. standing over young crop -**

The shelter-wood system prescribes the need for retention of older trees standing on steep, rocky areas, water bodies and other outer boundaries, blank etc. and also as a safety factor against fire (insurance reserve). Therefore 10% of the total standing volume of chil trees of 40cm & over dbh, available in PB-IV shall be retained to accommodate the above requirements. The remaining 90% of the volume of trees above 40 cms dbh will be available for felling.

**b) From thinning/cleaning i.e. trees of lower diameter classes (i.e. 20cm to 40cm dbh) -**

The average annual yield in the form of thinnings/cleanings available from the PB-IV area, is estimated to be around 20% of standing volume of chil crop of class III and IV i.e. 20 cm to 40 cms d.b.h. and retaining all of the V class trees with the aim to increase the stocking/ density of the forests.

The growing stock of this Periodic Block is tabulated below in Table 2.2.9.

**Table 2.2.9. Abstract of growing stock in PB IV**

	V	IV	III	IIA	IIB	IA	IB & above	Total
No.	91126	57581	31431	9240	3747	2346	2567	198038
Vol. M <sup>3</sup>	4556.30	13243.63	20430.15	12566.40	8805.45	8492.52	13348.40	81442.85

All removals shall count towards the total yield of this working circle.

$$Y = \frac{C_1 V_1 + C_2 V_2}{P}$$

The average annual yield calculated below, using the Hufgnal's formula.

Where  $Y$  = average annual yield in m<sup>3</sup>.

$C_1$  = Constant representing the fraction of volume of trees of class IIA & above that will be available for felling i.e. 0.8

$V_1$  = Corresponding Volume of trees 40 cm dbh and above (II & above)

$C_2$  = Constant representing the fraction of volume of trees of classes III & IV, that will be available for felling, i.e. 0.2

$V_2$  = Corresponding Volume of trees of 20-40 cm dbh (class III and IV)

$P$  = Plan period i.e 15 years.

Accordingly the average yield works out to be:

$$\begin{aligned} Y &= \frac{80\% \text{ of } 43212.77 + 20\% \text{ of } 33673.78}{15} \\ &= \frac{34570.21 + 6734.75}{15} \\ &= \frac{41304.96}{15} = 2753.66 \quad \text{or Say } 2500 \text{ M}^3 \end{aligned}$$

Hence the annual yield from PB IV areas of this working circle is **2500 m<sup>3</sup>**

**PRECRIBEDYIELD:** - The Current Annual Increment over the entire felling series as given in para 2.2.7 and Table 2.2.6 comes to 5240.777 m<sup>3</sup>. Hence yield prescribed from Felling Series – I is as below:

- (i) **P.B. – I = 1500 m<sup>3</sup>**
- (ii) **P.B. – IV = 2000 m<sup>3</sup>**

All removals shall count towards the total yield of this working circle.

**2.2.16.2. YIELD FROM FELLING SERIES-II:** - The current annual increment over the entire felling series as given in para 2.2.7 and Table 2.2.6 comes to 3548.273 m<sup>3</sup>. The annual yield according to Simmon's modification of Von Mantel formula is calculated as under: -

$$\text{Annual Yield } Y = \frac{2R}{R^2 - X^2} \times V$$

Where  $Y$  = Annual yield

$V$  = Volume of growing stock measured

$R$  = Rotation

X = Age corresponding to diameter to which the growing stock is measured.

Here X = 30

V = 1,15,345.25 m<sup>3</sup>

R = 120

$$\text{Therefore, } Y = \frac{2 \times 120 \times 1,15,345.25}{(120)^2 - (30)^2} \text{ m}^3$$

Y = 2,050.58 m<sup>3</sup> or say = 2,000 m<sup>3</sup>

**2.2.16.2.1. YIELD FROM P. B. I:** - The major yield from this periodic will be realized through the seeding fellings. The seeding fellings all over the P.B I areas will have to be completed during this plan period so that these can be regenerated with the regeneration period of 30 years. As all the areas in this periodic block are new, none of these will be ready for final fellings during this plan period. The growing stock of this Periodic Block is tabulated below in Table 2.2.10.

**Table 2.2.10 Abstract of growing stock in PB I**

	V	IV	III	IIA	IIB	IA	IB & above	Total
No.	92052	18749	3335	1360	836	659	548	117539
Vol. M <sup>3</sup>	4602.60	4312.27	2167.80	1849.60	1964.60	2385.58	2849.60	20132.00

The yield is calculated as under: -

All removals shall count towards the total yield of this working circle.

The average annual yield calculated below, using the Hufnagel's formula.

$$Y = \frac{C_1 V_1 + C_2 V_2}{P}$$

P

Where

Y = average annual yield in m<sup>3</sup>.

C<sub>1</sub> = Constant representing the fraction of volume of trees of class IIA & above that will be available for felling i.e. 0.8

V<sub>1</sub> = Corresponding Volume of trees 40 cm dbh and above (II & above)

C<sub>2</sub> = Constant representing the fraction of volume of trees of classes III & IV, that will be available for felling, i.e. 0.2

$V_2$  = Corresponding Volume of trees of 20-40 cm dbh (class III and IV)

P = Plan period i.e 15 years.

Accordingly the average yield works out to be:

$$\begin{aligned} Y &= \frac{80\% \text{ of } 9049.32 + 20\% \text{ of } 6480.07}{15} \\ &= \frac{7239.45 + 1296.01}{15} \\ &= \frac{8535.46}{15} = 569.03 \quad \text{or Say } 500 \text{ M}^3 \end{aligned}$$

Hence the annual yield from PB I areas of this working circle is **500 m<sup>3</sup>**

**2.2.16.2.2. YIELD FROM P. B. IV:** - 485.30 ha of the area of this working circle is under the PB-IV (PB regenerated) and has good stocking of pole crop. There are a good number of I and II class trees (mother trees) standing over and mixed with the established regeneration. Most of the I class trees are out of place and are required to be removed except those standing isolated in open place, or on the peripheries of the forests or on steep slopes. It is estimated that about 80 % of I & II class trees will be available for removal. Thus the yield from this Periodic Block will be available from two sources.

**a) From final fellings i.e. trees 40 cms and above in d.b.h. standing over young crop -**

The shelter-wood system prescribes the need for retention of older trees standing on steep, rocky areas, water bodies and other outer boundaries, blank etc. and also as a safety factor against fire (insurance reserve). Therefore 10% of the total standing volume of chil trees of 40cm & over dbh, available in PB-IV shall be retained to accommodate the above requirements. The remaining 90% of the volume of trees above 40 cms dbh will be available for felling.

**b) From thinning/cleaning i.e. trees of lower diameter classes (i.e. 20cm to 40cm dbh) -**

The average annual yield in the form of thinnings/cleanings available from the PB-IV area, is estimated to be around 20% of standing volume of chil crop of class III and IV i.e. 20 cm to 40 cms d.b.h. and retaining all of the V class trees with the aim to increase the stocking/ density of the forests.

The growing stock of this Periodic Block is tabulated below in Table 2.2.11.

**Table 2.2.11. Abstract of growing stock in PB IV**

	V	IV	III	IIA	IIB	IA	IB & above	Total
No.	98672	53139	11031	1580	472	188	108	165190
Vol. M <sup>3</sup>	4933.60	12222.00	7170.20	2148.80	1109.20	680.56	561.60	28825.884

All removals shall count towards the total yield of this working circle.

The average annual yield calculated below, using the Hufnagel's formula.

$$Y = \frac{C_1 V_1 + C_2 V_2}{P}$$

P

where Y = average annual yield in m<sup>3</sup>.

C<sub>1</sub> = Constant representing the fraction of volume of trees of class II & above that will be available for felling i.e. 0.8

V<sub>1</sub> = Corresponding Volume of trees 40 cm dbh and above (II & above)

C<sub>2</sub> = Constant representing the fraction of volume of trees of classes III & IV, that will be available for felling, i.e. 0.2

V<sub>2</sub> = Corresponding Volume of trees of 20-40 cm dbh (class III and IV)

P = Plan period i.e 15 years.

Accordingly the average yield works out to be:

$$\begin{aligned}
 Y &= \frac{80\% \text{ of } 4500.16 + 20\% \text{ of } 19392.20}{15} \\
 &= \frac{3600.12 + 3878.44}{15} \\
 &= \frac{7478.57}{15} = 498.57 \quad \text{or Say } 400 \text{ M}^3
 \end{aligned}$$

Hence the annual yield from PB IV areas of this working circle is **400 m<sup>3</sup>**

**PRECRIBEDYIELD:** -The Current Annual Increment over the entire felling series as given in para 2.2.7 and Table 2.2.6 comes to 3548.273 m<sup>3</sup>.Hence yield prescribed from Felling Series – II is as below:

- (i) **P.B. – I = 500 m<sup>3</sup>**
- (ii) **P.B. – IV = 400 m<sup>3</sup>**

**2.2.16.3. YIELD FROM FELLING SERIES-III:** - The current annual increment over the entire felling series as given in para 2.2.7 and Table 2.2.6 comes to 2,344.38 m<sup>3</sup>. The annual yield according to Simmon’s modification of Von Mantel formula is calculated as under: -

$$\text{Annual Yield } Y = \frac{2R}{R^2 - X^2} \times V$$

Where Y = Annual yield

V = Volume of growing stock measured

R = Rotation

X = Age corresponding to diameter to which the growing stock is measured.

Here X = 30

V = 94,9019.88 m<sup>3</sup>

R = 120

Therefore,  $Y = \frac{2 \times 120}{(120)^2 - (30)^2} \times 94,019.88 \text{ m}^3$

**Y = 1,671.46 m<sup>3</sup> or say = 1,600 m<sup>3</sup>**

**2.2.16.3.1. YIELD FROM P. B. I:** - The major yield from this periodic will be realized through the seeding fellings. The seeding fellings all over the P.B I areas will have to be completed during this plan period so that these can be regenerated with the regeneration period of 30 years. As all the areas in this periodic block are new, none of these will be ready for final fellings during this plan period.

The growing stock of this Periodic Block is tabulated below in Table 2.2.12.

**Table 2.2.12. Abstract of growing stock in PB I**

	<b>V</b>	<b>IV</b>	<b>III</b>	<b>IIA</b>	<b>IIB</b>	<b>IA</b>	<b>IB &amp; above</b>	<b>Total</b>
No.	23237	13515	4093	1474	797	370	300	43786
Vol. M <sup>3</sup>	1161.85	3108.50	2660.50	2004.60	1873.00	1339.40	1560.00	13707.74



All removals shall count towards the total yield of this working circle.

The average annual yield calculated below, using the Hufgnal's formula.

$$Y = \frac{C_1 V_1 + C_2 V_2}{P}$$

P

where

Y = average annual yield in m<sup>3</sup>.

C<sub>1</sub> = Constant representing the fraction of volume of trees of class II & above that will be available for felling i.e. 0.8

V<sub>1</sub> = Corresponding Volume of trees 40 cm dbh and above (II & above)

C<sub>2</sub> = Constant representing the fraction of volume of trees of classes III & IV, that will be available for felling, i.e. 0.2

V<sub>2</sub> = Corresponding Volume of trees of 20-40 cm dbh (class III and IV)

P = Plan period i.e 15 years.

Accordingly the average yield works out to be:

$$\begin{aligned} Y &= \frac{80\% \text{ of } 6777.00 + 20\% \text{ of } 5769.00}{15} \\ &= \frac{5421.60 + 1153.80}{15} \\ &= \frac{6574.80}{15} = 438.32 \quad \text{or Say } 400 \text{ M}^3 \end{aligned}$$

Hence the annual yield from PB I areas of this working circle is **400 m<sup>3</sup>**

**2.2.16.3.2. YIELD FROM P. B. IV:** - 254.05 ha of the area of this working circle is under the PB-IV (PB regenerated) and has good stocking of pole crop. There are a good number of I and II class trees (mother trees) standing over and mixed with the established regeneration. Most of the I class trees are out of place and are required to be removed except those standing isolated in open place, or on the peripheries of the forests or on steep slopes. It is estimated that about 80 % of I & II class trees will be available for removal. Thus the yield from this Periodic Block will be available from two sources.

**a) From final fellings i.e. trees 40 cms and above in d.b.h. standing over young crop -**

The shelter-wood system prescribes the need for retention of older trees standing on steep, rocky areas, water bodies and other outer boundaries, blank etc. and also as a safety factor against fire (insurance reserve). Therefore 10% of the total standing volume of chil trees of 40cm & over dbh, available in PB-IV shall be retained to accommodate the above requirements. The remaining 90% of the volume of trees above 40 cms dbh will be available for felling.

**b) From thinning/cleaning i.e. trees of lower diameter classes (i.e. 20cm to 40cm dbh) -**

The average annual yield in the form of thinnings/cleanings available from the PB-IV area, is estimated to be around 20% of standing volume of chil crop of class III and IV i.e. 20 cm to 40 cms d.b.h. and retaining all of the V class trees with the aim to increase the stocking/ density of the forests.

The growing stock of this Periodic Block is tabulated below in Table 2.2.13.

**Table 2.2.13. Abstract of growing stock in PB IV**

	<b>V</b>	<b>IV</b>	<b>III</b>	<b>IIA</b>	<b>IIB</b>	<b>IA</b>	<b>IB &amp; above</b>	<b>Total</b>
No.	45564	27183	10463	2691	909	350	296	87456
Vol. M <sup>3</sup>	2278.20	6252.10	6801.00	3659.80	2136.20	1267.00	1539.20	23933.35

All removals shall count towards the total yield of this working circle.

The average annual yield calculated below, using the Hufnagel's formula.

$$Y = \frac{C_1 V_1 + C_2 V_2}{P}$$

where

Y = average annual yield in m<sup>3</sup>.

C<sub>1</sub> = Constant representing the fraction of volume of trees of class II & above that will be available for felling i.e. 0.8

V<sub>1</sub> = Corresponding Volume of trees 40 cm dbh and above (II & above)

C<sub>2</sub> = Constant representing the fraction of volume of trees of classes III & IV, that will be available for felling, i.e. 0.2

V<sub>2</sub> = Corresponding Volume of trees of 20-40 cm dbh (class III and IV)

P = Plan period i.e 15 years.

Accordingly the average yield works out to be:

$$\begin{aligned} Y &= \frac{80\% \text{ of } 8602.20 + 20\% \text{ of } 13053.10}{15} \\ &= \frac{6881.76 + 2610.62}{15} \\ &= \frac{9492.38}{15} = 632.82 \quad \text{or Say } 600 \text{ M}^3 \end{aligned}$$

Hence the annual yield from PB IV areas of this working circle is **600 m<sup>3</sup>**

**PRECRIBEDYIELD:** - The Current Annual Increment over the entire felling series as given in para 2.2.7 and Table 2.2.6 comes to 2344.383 m<sup>3</sup>. Hence yield prescribed from Felling Series – III is as below:

- (i) **P.B. – I = 400 m<sup>3</sup>**
- (ii) **P.B. – IV = 600 m<sup>3</sup>**

**2.2.17. METHODS OF EXECUTING FELLINGS IN P.B.I:** - There are generally two kinds of fellings in this periodic block, (i) Seeding Felling and (ii) Final Felling. The detailed marking rules are contained in the H.P. Forest Manual Vol. IV. The following guidelines are, however, given for the guidance of Marking Officers: -

**2.2.17.1. (a) SEEDING FELLING:** - Crops are sufficiently open to permit the establishment of a great deal of regeneration even without felling. Many areas have sufficient natural regeneration. Simple closures against grazing and silvicultural opening at some places will help in regenerating the areas and establishing the regeneration. However, for the guidance of Marking Officer following guidelines are given:

(i) About 20 to 25 trees per ha shall be retained as seed bearers. The seed bearers preferably be from the trees of middle age to mature (IIA and IIB) and should have well developed crowns, long, clean, cylindrical boles and should be free from twist and disease.

(ii) The seed bearers, in the moderately sloping areas, should be, as far as possible uniformly distributed giving an average spacing of 23 to 25 meters but in more hilly areas these will be kept on ridges and spurs.

(iii) On steep and broken ground, along the banks of nallas and other vulnerable situations markings shall be conservative conforming to the selection principles.

(iv) Compact groups of healthy and vigorously growing pole crop up to 30cm. d.b.h., not less than 0.2 ha. in extent and having at least 0.7 densities shall be retained as part of future crop. All trees of larger dimensions occurring in the patches of such advance growth shall be removed provided no permanent opening is caused in the canopy.

(v) Congested groups of pole crop being retained as advance growth shall be thinned to the C-grade thinning.

(vi) Scattered young poles (up to IV class) and saplings which can merge into future crop shall not be removed as their occurrence will help in moisture conservation and also keep the weeds under control.

(vii) All isolated III class trees, which are bound to develop into wolf trees, will be marked in felling series-I, but will be retained in felling series-II and III to meet the requirement of right holders.

(viii) In certain cases, regeneration of sapling to pole stage may already present. Markings in the over wood standing over such groups of regeneration shall be heavier so as to afford better growth conditions to these groups. It is to be to the nature of secondary fellings.

(ix) Except when considered necessary for the development of or interfering with the chil regeneration and advance growth, the broad-leaved trees shall not be removed, as it is advisable to retain as a healthy mixture for improvement of the soil and also to meet the local requirement for fuel and fodder.

(x) Only selection cum improvement markings will be carried out in a width of 15 meters on either side of the main road.

**2.2.17.2. (b) FINAL FELLINGS:** - The following guidelines are laid down for guidance of Marking Officers:

(i) Final fellings will be carried out when only when the regeneration has attained a height of at least 2.5 meters and has been controlled burnt thrice.

(ii) About 5 seed bearers per ha tall, healthy and vigorously growing, will be retained until the end of regeneration period as a fire insurance measure, increment trees and to meet the local demands.

(iii) Advance growth retained at the time of seeding felling shall, in no case, be felled. Thinnings may, however, be carried out if required.

(iv) Seed bearers shall be lopped before felling to minimize damage to the young crop.

A marking note along with detailed marking map of the area delineating the type of markings carried out in various parts of the compartment and the advance growth retained shall be prepared by the marking officer and posted in the compartment history files for the future guidance. A record of seed bearers retained at the time of seeding felling should also be prepared and placed in the compartment history file as a check over markings and future removals.

**2.2.18. METHODS OF EXECUTING FELLINGS IN P.B.II:** - No fellings shall be carried out in this periodic block in order to safeguard the future yield. Removal of only the dead and fallen trees is permitted to improve the hygiene of the crop. No green trees should be granted in timber distribution rights from the areas allotted to this P.B.

**2.2.19. METHODS OF EXECUTING FELLINGS IN P.B.III:** - These forests will be gone over in thinnings and improvement fellings. The markings will be done only to meet the local requirement of the people and other barren requirements. The principles to be followed will be as under: -

(i) Removal shall be confined mainly to the dry and fallen trees which shall be marked first.

(ii) Dense, compact groups of poles will be thinned by removal of suppressed trees along with unusually bigger trees, if any, occurring in such groups.

(iii) The intensity of markings, in no case, to exceed D-grade of thinnings.

(iv) All markings are primarily to be done for improvement of the crop. The tendency to remove selected, well-grown better stems must be avoided.

**2.2.20. METHODS OF EXECUTING FELLINGS IN P.B.IV:** - In this periodic block many compartments will contain mother trees those are no longer required. The fellings shall aim at removal of such trees. Cleanings and early thinnings in the young crop is also necessary to obviate congestion. The cut material of such poles is normally utilized as fuel and fence post. The following marking rules are laid down:

(i) All I class and most of II class trees shall be marked for fellings unless required on silvicultural considerations.

(ii) Isolated II and III class trees standing over the young crop that are likely to develop as prospective wolf trees shall be removed.

(iii) Along the nalla-banks and on very steep slopes, removal of over wood should be conservative.

(iv) All dry and fallen trees shall be removed to improve the crop.

(v) Thinnings and cleanings shall be carried out in the congested young crop conforming to the D-grade of thinnings. Detailed guidelines about thinnings and cleanings are available in chapter I of the Vol. IV of H.P. Forest Manual.

**2.2.21. METHODS OF EXECUTING FELLINGS IN P.B.U. (F.S.II):** - No regular thinnings / fellings are required to be carried out at present as the crop is very open. The fellings, only to meet the various types of demands of the right holders, being unavoidable, are to be made. These will be done strictly on silvicultural principles, keeping in view the density and the terrain of the forests.

**2.2.22. SEQUENCE OF FELLINGS:** - The following sequence of fellings for each felling Series is laid down. It can, however, be altered by the Divisional Forest Officer with the permission of the C.C.F. Working Plan.

**2.2.22.1. FELLING SERIES-I:**

**2.2.22.1.1(a) FELLINGS IN P.B.I:** The sequence of seeding fellings and final fellings in P.B.I areas are given as under in Table 2.2.8.

**Table: 2.2.8. Sequence of fellings in P.B.I areas**

Year.	Range.	Name of Forest.	Comptt./Sub-Comptt.	Area (ha.)
1	2	3	4	5
2010-11	Palampur	P.24 P. Ghunetta.	1c	13.35
	-do-	P.17.P. Bandhiara.	3	15.78
2011-12	Bajjnath.	P.12.B. Panjala.	1c	9.71
	Daroh	P.40.P. Duhak.	3a	10.12
2012-13	Palampur.	P.19.P. Lahla.	1c	10.12
	Bajjnath.	P.12.B. Panjala.	2c	7.28
2013-14	Daroh	P.40.P. Duhak.	3b	30.75
2014-15	Palampur.	P.19.P. Lahla.	3c(i)	30.10
2015-16	Palampur.	P.19.P. Lahla.	2c	15.78
	-do-	P.25.P. Dhinju.	1d	4.86
2016-17	Palampur.	P.19.P. Lahla	4c	5.62
	-do-	P.56.P.Cheli.	1	9.71
2017-18	Palampur.	P.24.P. Ghanetta.	2c	14.16
	-do-	P.64.P. Asanpatt-II	Whole	7.16
2018-19	Palampur.	P.61.P. Barsar.	Whole	21.30
2019-20	Palampur.	P.27.P. Khatin.	1a	26.30
2020-21	Palampur.	P.19.P. Lahla.	3c(ii)	38.69
2021-22	Palampur.	P.24.P. Ghanetta.	4a	7.69
	Bajjnath	P.13.B. Baggidhar.	2c	17.81
2022-23	Palampur.	P.25.P. Dhinju.	1c	8.09
	-do-	P.66.P. Brahmtheru.	Whole	8.42
2023-24	Palampur.	P.20.P. Paror.	1c	5.26
	Bajjnath	P.73.B. Mandher-khurd.	Whole	32.56
2024-25	Palampur	P.68.P. Rakh.	Whole	30.27

**2.2.22.1.2. (b) FINAL FELLINGS CUM THINNINGS IN P.B. IV:** - The sequence of final fellings cum thinnings in P.B.IV areas is tabulated as under in Table 2.2.9.

**Table: 2.2.9.Sequence of fellings-cum-thinnings in P.B.IV areas.**

Year	Range.	Name of Forest.	Comptt./Sub-Comptt.	Area (ha.)
1	2	3	4	5
2010-11	Palampur	P.17.P. Bandhiara.	2	15.38
	Bajnath.	P.12.B. Panjala.	1b	11.33
2011-12	Palampur.	P.19.P. Lahla.	2b	12.14
	-do-	P.24.P. Ghanetta.	1b	15.78
	Daroh.	P.40 P. Duhak.	2a	6.48
2012-13	Bajnath.	P.13.B. Baggidhar.	2a	16.19
	Palampur	P.24.P. Ghanetta.	4c	8.09
2013-14	Palampur.	P.19.P. Lahla.	3b(ii)	48.96
2014-15	Palampur.	P.24.P. Ghanetta.	3a	6.07
	Daroh.	P.40.P. Duhak.	2b	17.81
2015-16	Palampur.	P.24.P. Ghanetta.	3b	9.30
	Daroh.	P.36.P. Bajur Gahar.	1b	5.26
	-do-	P.31 P. Sakrotu.	2	9.71
2016-17	Palampur.	P.24.P. Ghanetta.	3c	10.53
	Bajnath.	P.13.B. Baggidhar	2b	16.19
2017-18	Palampur.	P.56.P. Cheli.	2	22.11
2018-19	Palampur.	P.25.P. Dhinju.	1b	5.26
	Bajnath.	P.13.B. Baggidhar.	3a	12.95
2019-20	Palampur.	P.58.P. Dadh-Jhikli.	Whole.	11.72
	-do-	P.63.P. Ban-Bharthari.	Whole.	9.99
2020-21	Palampur.	P.24.P. Ghanetta.	2b	15.78
	-do-	P.20.P. Paror.	1b	4.86
2021-22	Palampur.	P.65.P. Asanpat-I.	Whole.	13.81
	-do-	P.26.P. Bheru.	2	12.95
2022-23	Palampur.	P.26.P. Bheru.	3	15.37
	-do-	P.19.P. Lahla.	4 (b)	6.88
2023-24	Bajnath.	P.12.B. Panjala.	2b	6.48
	-do-	P.11 P. Sansal.	3	19.42
	Palampur.	P.19.P. Lahla.	1b	6.88
2024-25	Palampur.	P.19.P. Lahla.	3d(i)	19.42

#### **2.2.22.2. FELLING SERIES II: -**

**2.2.22.2.1(a) FELLINGS IN P.B.I:** - Keeping in view their legal status, difficulties are envisaged in securing closures in the forests belonging to this felling series. The felling sequence in these forests is therefore, suggestive in nature and the Divisional Forest Officer may alter it. The sequence of seeding felling is given as under in Table 2.2.10.

**Table: 2.2.10. Sequence of fellings in P.B.I areas (Area in ha.)**

<b>Year</b>	<b>Range.</b>	<b>Name of Forest.</b>	<b>Comptt./Sub-Comptt.</b>	<b>Area (ha.)</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
2010-11	Palampur.	U.P.5.P. Barsar.	Whole	11.88
	Baijnath.	U.P.37.B. Chaniara.	1	10.12
2011-12	Daroh.	U.P.51.P.Dhaniara	1	14.16
	Palampur.	U.P.17.P. Asanpat.	1	4.09
2012-13	Daroh.	U.P.73.P. Ghadella.	3	24.28
2013-14	Baijnath.	U.P.125.B. Sansal.	4	39.66
2014-15	Palampur.	U.8.P. Kandi.	1a	38.45
2015-16	Daroh.	U.P.85.P. Nagni.	2	17.40
2016-17	Baijnath.	U.P.125.B. Sansal.	5	27.52
2017-18	Naijnath.	U.4.B. Lanod.	4	37.64
2018-19	Baijnath.	U.5.B. Deol.	3	18.21
2019-20	Baijnath.	U.7.B. Bhattu.	1	49.36
2020-21	Bailnath.	U.44.B. Ghorpith.	2	17.00
2021-22	Baijnath.	U.23.P. Kharas-Karot.	1	25.09
2022-23	Baijnath.	U.4.B. Lanod.	6	73.64
2023-24	Palampur.	U.P.3 P. Diala.	1	48.55

**2.2.22.2.2. (b) FINAL FELLINGS CUM THINNINGS IN P.B. IV:** - Most of the areas allotted to this P.B. are established plantations raised during the last thirty years, therefore in these areas fellings shall be of mainly thinning nature. Keeping in view their legal status, difficulties are envisaged in securing closures in the forests belonging to this felling series. The felling sequence in these forests is therefore, suggestive in nature and the Divisional Forest Officer may alter it. The sequence of final fellings cum thinnings in P.B.IV areas is tabulated as under in Table 2.2.11.



**Table: 2.2.11. Sequence of fellings-cum-thinnings in P.B.IV areas.**

Year	Range.	Name of Forest.	Comptt./Sub-Comptt.	Area (ha.)
1	2	3	4	5
2010-11	Palampur.	U.P.10 P. Ghamrotha.	1	8.90
	Bajjnath.	U.P.27 B. Dhanag.	1	14.16
	Daroh.	U.P.92 P. Jamula Talinu.	1	12.55
2011-12	Palampur.	U.P.11 P. Rakh.	2	10.43
	-do-	U.P.24 P. Bindraban.	3	36.42
2012-13	Bajjnath.	U.P.31 B. Baggidhar.	4	56.65
2013-14	Palampur.	U.P.121 P. Brankar.	1	20.23
	Daroh.	U.P.87 P. Fasta.	1	12.14
2014-15	Bajjnath.	U.P.31 B. Baggidhar.	6	58.27
	Daroh.	U.P.70 P. Bhranta.	2	8.50
2015-16	Palampur	U.P.11 P. Rakh.	1	3.41
	Bajjnath.	U.5 B. Deol.	1	14.57
	Daroh.	U.P.65 P. Baloh.	2	7.28
	-do-	U.P.65 P. Baloh.	3	5.67
2016-17	Palampur.	U.42 P. Rajnali.	1	4.05
	Bajjnath.	U.P.36 B. Kudail Buhli.	2	13.35
	Palampur.	U.P.15 P. Darang.	1	2.25
	-do-	U.P.123 P. Ludran.	2	7.28
2017-18	Palampur.	U.42 P. Rajnali.	2	6.07
	Bajjnath.	U.P.37 B. Chaniara.	2	9.71
	-do-	U.P.38 B. Chobin.	1	8.09
	Palampur.	U.P.122 P. Mahadev.	3	6.07
2018-19	Palampur.	U.P.17 P. Asanpat.	2	11.05
	-do-	U.P.122 P. Mahadev.	2	6.48
	Daroh.	U.P.65 P. Baloh.	4	10.12
	Palampur.	U.P.17 P.Asanpat.	2	11.05
2019-20	Palampur.	U.8 P. Kandi.	4	7.28
	Bajjnath.	U.P.125 B. Sansal.	1	7.80
	-do-	U.P.42 B. Sansai-II.	1c	9.22
	-do-	U.P.125 B. Sansal.	2a	2.05
2020-21	Bajjnath.	U.4 B. Lanod.	1	12.14
	Daroh.	U.P.60 P. Thural-I.	1	17.40
2021-22	Bajjnath.	U.7 B. Bhattu.	2	14.57
2022-23	Daroh.	U.P.60 P. Thural-I.	5	8.50
	Bajjnath.	U.P.31 B. Baggidhar.	1	14.16
2023-24	Bajjnath.	U.P.31 B. Baggidhar.	3	24.28
2024-25	Palampur.	U.P.24 P. Bindraban.	1	12.14

### 2.2.22.3. FELLING SERIES III: -

**2.2.22.3.1(a) FELLINGS IN P.B.I:** - Keeping in view their legal status, difficulties are envisaged in securing closures in the forests belonging to this felling series. The felling sequence in these forests is therefore, suggestive in nature and the Divisional Forest Officer may alter it. The sequence of seeding felling is given as under in Table 2.2.12.

**Table: 2.2.12. Sequence of fellings in P.B.I areas (Area in ha.)**

Year	Range.	Name of Forest.	Comptt./Sub-Comptt.	Area (ha.)
1	2	3	4	5
2010-11	Palampur.	Khalet.	P.3a.	11.73
2011-12	Palampur.	Arla-Saloh.	U.P.12	3.64
2012-13	Palampur.	Bhagotla.	U.10	3.24
2013-14	Palampur.	Panaper.	P.3	20.64
2014-15	Palampur.	Panaper.	P.17	15.38
2015-16	Palampur.	Gaggal.	P.16	7.28
2016-17	Palampur.	Gaggal.	U.P.24	1.62
2017-18	Palampur.	Gaggal.	U.P.27	1.62
	-do-	-do-	U.P.57	2.02
2018-19	Palampur.	-do-	U.P.53	3.24
	-do-	Arla-Saloh	U.P.11	10.11
2019-20	Palampur.	Gaggal.	U.P.36	4.05
	-do-	Arla-Saloh	U.P.5	6.07
2020-21	Palampur.	Gaggal.	U.P.38	4.86
	Daroh	Maniara.	U.P.6	10.11
	Palampur.	Gaggal.	U.P.35	2.43
2021-22	Palampur	Paror	U.P.8	17.40
	-do-	Kusmal.	B.M.5b.	2.02
	-do-	Gaggal.	P.31	5.66
2022-23	Daroh	Maniara.	U.P.3	25.49
	Palampur.	Khalet.	U.P.12	3.24
	-do-	Gaggal.	U.P.39	2.43
2023-24	Daroh	Maniara.	U.P.9	16.19
	-do-	Punner-Dehan.	U.P.1	1.62
	Palampur.	Gaggal.	U.P.71	5.26
2024-25	Daroh	Maniara.	U.P.22	15.78
	Palampur.	Khalet.	U.P.9	2.43

**2.2.22.3.2. (b) FINAL FELLINGS CUM THINNINGS IN P.B. IV:** - The sequence of final fellings cum thinnings in P.B.IV areas is tabulated as under in Table 2.2.13.

**Table: 2.2.13. Sequence of fellings-cum-thinnings in P.B.IV areas**

Year	Range.	Name of Forest.	Comptt./Sub-Comptt.	Area (ha.)
1	2	3	4	5
2010-11	Palampur.	Paror.	P.2	4.85
2011-12	Palampur.	Khalet.	U.P.7	2.43
	-do-	Paror.	U.P.4a.	11.33
2012-13	Palampur.	Paror.	U.P.4b.	11.33
	Daroh.	Balota.	U.P.2	6.07
2013-14	Palampur.	Paror.	U.P.7	27.92
2014-15	Daroh.	Balota.	U.P.1	6.07
	-do-	Arla-Saloh.	U.P.6	2.83
	Daroh.	Maniara.	U.P.23	2.43
2015-16	Palampur.	Arla-Saloh.	U.P.10	19.02
2016-17	Palampur.	Gaggal.	U.P.63	4.05
	Daroh.	Balota.	U.P. 5	2.43
	-do-	Maniara.	P.4a.	7.69
2017-18	Palampur.	Bhagotla.	U.7	10.92
	-do-	Gaggal.	P.70	8.09
2018-19	Palampur.	Panaper.	P.2	21.04
2019-20	Palampur.	Arla-Saloh.	U.P.15	8.50
	-do-	Panaper.	P.19	6.47
2021-22	Palampur.	Kusmal.	U.2	21.04
2022-23	Palampur.	Gaggal.	U.P.55	9.71
	Daroh.	Maniara	U.P.7	7.28
2022-23	Daroh.	Punner-Dehan.	S.31	5.66
	Palampur	Gaggal.	P.32	6.88
	-do-	Khalet.	P.3b.	12.13
2023-24	Palampur	Gaggal.	U.P.50	2.02
	Daroh	Maniara	U.P.13	12.54
2024-25	Palampur	Gaggal.	U.P.60	1.62
	-do-	Gaggal.	U.P.66	2.83
	Daroh	Maniara.	U.P.5	8.90

**2.2.23. SUBSIDIARY SILVICULTURAL OPERATIONS IN P.B.-I:** - Details of various subsidiary silvicultural operations to be carried out in P.B. I areas are described as below:

**2.2.23.1. DISPOSAL OF FELLING DEBRIS:** - Soon after the fellings are over, all felling refuse should be collected in heaps at safe places, away from the advance growth and the seed bearers and thoroughly burnt so as to provide a clean and receptive bed for the germination of seed. Very often, the local people take away the debris for fuel. They should be encouraged to do so. Collection and

burning of debris should commence from top of the forest and progress downhill. Chips should be thoroughly raked to ensure complete burning. In areas where regeneration already exists and where final fellings are to be made no attempt at burning the felling debris should be made. In such places the refuse should simply be dumped in depressions and nallas so that the young growth is kept free of slash and lops and tops of felled trees. Detailed instructions on the subject are contained in the Chapter 7 of the H.P. Manual Vol. IV which shall always be adhered.

**2.2.23.2. SUBSIDIARY FELLINGS:** - All marked and damaged trees left unfelled, along with malformed and ill-developed stems in the advanced growth should be cut before burning of the debris and allowed to be removed by the local people; the leftovers should be burnt along with the felling refuse. The climbers, along with other unwanted growth, should be cut away.

**2.2.23.3. WEEDING AND BUSH CUTTING:** - Weeds are normally not a serious problem in these forests. But in some forests of Palampur and Droh ranges Lantana is posing a considerable threat to establishment of natural regeneration. Weedings are, however, very much necessary for the proper development and establishment of seedlings and this operation should be given due importance. Lantana, Carissa, Myrsine, Dodonaea, Ageratum, and Pogostemon are the main weeds inhibiting regeneration. All such weeds and other bush growth in the regeneration areas should be cut repeatedly and till the young plants become free from suppression. Ordinarily two weeding in the first year (one in July and other in September) and thereafter, one weeding during rains for four five years will be necessary. In damp localities, the removal of shrubby oaks and Rhododendron will also be helpful.

**2.2.23.4. CLEANINGS:** - Natural regeneration of chil is generally profuse and dense. Cleanings from the very beginning are, therefore, essential for proper growth of the seedlings. Cleanings must therefore commence early and repeated after short intervals to provide ample space to seedlings to make them grow rapidly. However, in all cleaning operations the vigour and quality of the saplings should be given more consideration than the spacing. Cleanings should start at the age of three when saplings reach a height of app. One meter and spaced about one meter apart. Second cleaning should be carried out when the crop is about two meter height at which time it will be spaced about three meter apart. Cut material unless required by the villagers will be collected at open spaces or in nallas and burnt in order to reduce the fire hazards. Early cleanings will reduce the cost of other tending operations like pruning and bush cutting. Proper spacing at the time of cleanings will obviate the necessity of carrying out early un-saleable thinnings.

**2.2.23.5. SOWING AND PLANTING:** - Chil regeneration is plentiful in this locality if adequate protection against fire and grazing is ensured. However, in some lower areas where conditions are not so favourable, artificial regeneration will have to be resorted to. After the seeding fellings, subsidiary fellings and the debris burning, the area will be immediately taken up for planting. Chil seedlings raised in

polythene bags will be planted in July-August. The nursery and plantation techniques of chil are well established and understood by the field staff. The planting should not be left entirely to the labour and must be carried out under the supervision of trained personnel. Proper care in handling of the seedlings during transportation and timely planting, during early monsoon, are of vital significance. Collection of seed should be given due consideration so that the best quality seed, only from the selected stems is utilized. Properly aligned inspection paths in all the regeneration areas where these do not exist should invariably be constructed.

**2.2.23.6. CULTURAL OPERATIONS IN P.B. IV:** - Tending operations, such as cleanings and mechanical thinnings, shall be carried out in the dense crop. The available material, if not sale-able, should be disposed off locally. Sale-ability of such material should not be taken as an excuse to neglect these operations, as these are very necessary to reduce the fire hazards.

**2.2.24. OTHER REGULATIONS:** - Other regulations for this working circle will be as under: -

**2.2.24.1. CLOSURES:** - All P.B. I areas shall be closed to grazing by proper fencing immediately after the felling is over and in cases where area could not be felled due to ban on green felling, the subsequent to the year prescribed for felling and shall remain closed for about 30 years. Though, the regeneration period is of 30 years, it will not be always necessary to enforce closure for full regeneration period as chil saplings are beyond the damage with in a period of 15-20 years. In the case of un-delimited un-classed Forests, steps to complete the necessary codal formalities for closures must be taken in advance so that closures are duly notified before commencement of operations.

**2.2.24.2. GRAZING AND GRASS CUTTING:** - Grass-cutting will be prohibited in all the P.B. I areas after commencement of regeneration operations till the young crop is beyond the stage of damage, i.e. about 50 cm. and up. Grass cutting shall be allowed to be carried out under the strict supervision of the forest guard so that seedlings are not cut along with grass. Grazing shall be strictly prohibited in the regeneration areas till the regeneration reaches a height of more than one meter. After that light grazing (not goat) should be permitted to reduce inflammable grasses. Unrestricted grazing should not be allowed till regeneration is fully established.

**2.2.24.3. FIRE-PROTECTION AND CONTROL BURNING:** - Chil forests are more vulnerable to the risk of forest fires than any other type of forests. Considerably large areas of chil forests get burnt every year. In case of severe fires, even the well- regenerated pole crops receive serious set back. Therefore, it is very essential that forests allotted to this working circle be adequately protected from fire. Apart from various measures of fire protection viz. earning the goodwill and co-operation of the local people through Joint Forest Management and meeting their genuine demands, education and publicity, taking punitive action should not be

neglected. The control burning is the most important operation and should never be neglected. Detailed instructions on control burning are contained in the H.P. Forest Mannual Vol. IV and are summarized below: -

(i) The control burning should be done always during winter, in January-February.

(ii) Burning should progress from up-hill to down-hill in calm weather and special care should be taken to keep the fire lines as straight as possible and under control.

(iii) The fire should start along the ridge, a cleared path or specially cleared lines.

(iv) Chil needles and other inflammable material should be fully raked to ensure through burning.

(v) In forests under resin tapping, must be ensured that all chips, fallen resin, needle etc. are cleared about 1.5 meter away from the base of the trees by the resin coolies.

(vi) Cleaning and early thinning in young regeneration areas must be completed before the control burning.

(vii) Burning shall be done always under strict supervision and control of the executive staff and shall never be left to the engaged labour.

(viii) The existing fire lines should be properly maintained and kept clear. The roads bridle paths and inspection paths must be kept clear of all inflammable material so as to act as fire lines.

(ix) Sufficient number of trained fire-watchers should be employed during the fire season to help the field staff and provided with necessary equipments. No felling operations, even to the right holders, should be allowed during fire season.

It is, however, to be noted that areas under regeneration should not be control burnt until the regeneration reaches a height of about 1.5 meter. In such areas, however, the grass cutting/needle collection by right holders be encouraged.

The control burning will also form a part of control forms and deviation reflected therein very clearly giving reasons.

**2.2.24.4. PROGRAMME FOR CONTROL BURNING:** -Triennial programme of control burning is given in **Table: 2.11.3 Para 2.11.7.1.11** (Chapter-11 Fire Protection). It is prescribed that in case of any area could not be control burnt in the prescribed year, it should be control burnt in the following year. In case of area getting burnt, the control burning should be decided by the D.F.O. on merits of the case. It is also prescribed that D.F.O. should add other areas also, not prescribed here, to the control-burning programme depending upon their requirements.

**2.2.24.5. FIRE LINES:** - The existing fire lines, as given below in Table 2.2.11 should be properly maintained and kept clear. The roads, bridle paths and inspection paths must be kept clear of all inflammable material so as to act as fire line.

**Table: List of Existing Fire Lines.**

Sr. No.	Range.	Forest.	Length (Km.)	Width (m.)
1	2	3	4	5
1	Palampur	P.24 P. Ghunetta.	2.500	10
2	-do-	CFS Bhagotla	1.500	10
3	-do-	P.71 P. Bhandiara	0.500	10
4	-do-	CFS Bhagotla	0.500	10
5	-do-	P.21 P. Paror	1.600	10
6	-do-	CFS Gaggal	1.200	10
7	-do-	U 8 P Kandi	3.000	10
8	Baijnath	P.13 B. Baggidhar & U.P.31B. Baggidhar	1.500	10
9	-do-	P.21 B Andretta	1.500	10
10	-do-	P.12 P. Panjala	1.500	10
11	-do-	U.43 B. Bhadraina	1.00	10
12	Daroh	P. 40 J. Duhak	2.500	10
13	-do-	P.23P. Ban-Kurang	1.500	10
	<b>Total</b>		<b>20.300</b>	

**2.2.24.6. FIRE MAPS:** - All cases of fires should be promptly reported giving the extent of damage. A tracing of all the burnt areas 0.4 ha in extent and above should be prepared on 1:3,750 scale and sent along with the report, copy should also be placed in the respective compartment history file.

**2.2.24.7. MONITORING:** -It is also prescribed that the fire prevention measures will be monitored by C.C.F. (Protection).

**2.2.25. RESIN TAPPING:** - Resin tapping must be carried out strictly in accordance with the instructions laid down in Punjab Forest Leaflet No. 13 and other instructions issued by the Pr. C.C.F. from time to time. The resin tapping shall be carried out in PB – II and III areas only. Though, the resin tapping operation is being carried out by the H.P. State Forest Corporation Ltd. but the responsibility of the territorial staff to enforce the instructions remains paramount. The resin tapping is to be done by Rill method. The enumerations are to be carried out every five years as per prevailing instructions. In case drying up of trees due to resin tapping is observed in some forests it should be immediately closed for tapping. Such forests must be given rest from resin tapping in rotation at least for five years. Re-tapping in such forests should be taken up for tapping after a minimum period of five years only after the reasons for drying up of trees are analysed and effective steps to prevent recurrence taken. Complete record in this respect will be maintained at Divisional level. The resin tapping is dealt in detail in the **Chapter-IV Part-I (ACTIVITIES OF STATE FOREST DEVELOPMENT CORPORATION LTD.)**. However, following points require special attention:

(i) Rider should not be allowed to be removed / adjusted so that the freshening knife is not able to make rills deeper than 2mm.

(ii) Width of rills should remain within prescribed limit of 6-7 mm. so that inter rill bark does not become fragile and consequently break.

(iii) The total size of blaze should remain within prescribed limit of 36-38 / 20 cm. and number of rills in a season should not exceed 32

(iv) New channel should be started only after the previous one has been tapped for 4-5 years and intervening space between to adjoining channels should not be less than 7.5 cms.

(v) Strict supervision should be exercised over the concentration of acids in the stimulant since higher concentration can irreparably damage the tissue thereby affecting adversely the process of healing.

**2.2.26. RIGHT HOLDERS DEMAND FOR T.D.:** - T.D. should be marked preferably from Final Felling (PB-I) and PB-IV (removal of over wood) areas. Silviculturally available trees from such areas should be marked for T.D. irrespective of their year of felling. No T.D. should be marked from PB-II areas. Requirement of T.D. for the next 15 years is anticipated at 2000 cum. per year.

**2.2.27. REGENERATION ASSESSMENT SURVEYS:** - The regeneration assessment survey of the felled PB-I areas will be done every alternate year for at least 10 years. In case regeneration does not keep pace with fellings, corrective measures shall be taken by resorting to artificial regeneration to restock the area in prescribed time. The reports are to be placed before the review committee of the Govt. of India at the time of periodic review.

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## CHAPTER-III

### THE BAN OAK WORKING CIRCLE

**2.3.1. GENERAL CONSTITUTION AND CHARACTER OF THE VEGETATION:** - This working circle comprises of all the all-pure or nearly pure ban oak forests. Total area of this working circle is 3,509.28 ha which are situated mainly in Palampur and Baijnath ranges. Table 2.3.1 gives the distribution of the circle range wise:

**Table 2.3.1. Range wise distribution of Area.**

Sr. No.	Class of forest	Range wise area in ha.		Total area (ha.)
		Palampur	Baijnath	
1	2	3	4	5
1	D.P.F.	1,880.30	72.04	1,952.34
2	U.P.F.	14.16	-	14.16
3	U.F.	1,351.80	186.93	1,538.73
4	C.F.S.	4.05	-	4.05
	<b>Total.</b>	<b>3,250.31</b>	<b>258.97</b>	<b>3,509.28</b>

The general character of the Ban oak forests has been described in detail in **Para 1.2.3 Chapter II (Part I)**. Except the areas regenerated in the past, the forests of this circle are generally under stocked and the distribution of age classes is far from normal. The forests near the habitations are excessively lopped and over-grazed. The crop, in most of the forests, is middle aged to mature and the oak trees are generally malformed and crooked due to excessive lopping. Younger age classes are well represented in areas under depot felling series but deficient in preservation felling series. Deodar has been introduced at places with generally poor success. In lower fringes, chil is invading along the ridges and exposed areas or where the canopy is open.

**2.3.2. BLOCKS AND COMPARTMENTS:** - No change has been made in the boundaries of the forests. The compartment/sub-compartments also generally remains unchanged. The changes, if any, have been given in **Para 2.1.16 Chapter-I (Part-II)**.

**2.3.3. FELLING SERIES:** - There is complete ban on felling of green ban oak trees. However two Felling Series, Depot Felling Series and Preservation Felling Series has been constituted for the academic interest because forests under Depot felling Series are under regular management since Mohan's Plan.

**2.3.3.1. DEPOT FELLING SERIES:** - This comprises of those Delimited protected Forests of the circle which have been under regular management since Mohan's Plan (1931) under Shelter Wood System.

**2.3.3.2. PRESERVATION FELLING SERIES:** - The remaining D.P.F's, Un-delimited Protected, Un-classed Forests and C.F.S. of the circle have been included in this series. These forests have so far remained under protection except C.F.S. Ghadoral, which was in Plantation Working circle in Plan under revision. In future these are to be zealously preserved and protected as saviours of important watersheds.

**2.3.4. SPECIAL OBJECTS OF MANAGEMENT:** - The special objects of management for these forests will be as under: -

1. To protect and preserve the Ban oak high forests for their environmental and ameliorative benefits.
2. To meet the demands of local people and others for fuel, charcoal, fodder and grazing.
3. To improve the stocking of open ban oak forests by planting and sowing operations.

**2.3.5. CHOICE OF SPECIES:** -These forests will be maintained and regenerated with Ban-oak strictly. The tendency to plant chil in these forests needs to be curbed.

**2.3.6. AREA AND ALLOTMENT:** - Table 2.3.2 gives range wise area under each Felling Series: -

**Table 2.3.2. Felling Series wise area in Ban Oak Working Circle (ha)**

Range.	Class of Forest.	Depot Felling Series.	Preservation Felling Series.	Total (ha)
1	2	3	4	5
<b>Palampur.</b>				
	D.P.F.	393.93	1486.97	1,880.30
	U.P.F.	-	14.16	14.16
	U.F.	-	1,351.80	1,351.80
	C.F.S.	-	4.05	4.05
	<b>Total.</b>	<b>393.93</b>	<b>2,856.98</b>	<b>3,250.91</b>
<b>Bajnath.</b>	D.P.F.	72.04	-	72.04
	U.F.	-	186.93	186.93
	<b>Total.</b>	<b>72.04</b>	<b>186.93</b>	<b>258.97</b>
<b>Total Division.</b>	D.P.F.	465.97	1,486.97	1,952.94
	U.P.F.	-	14.16	14.16
	U.F.	-	1,351.80	1,538.73
	C.F.S.	-	4.05	4.05
	<b>Grand Total.</b>	<b>465.97</b>	<b>3,043.91</b>	<b>3,509.28</b>

**2.3.7. ANALYSIS AND VALUATION OF CROP:** - The crop is analyzed as under: -

**2.3.7.1. STOCK MAPS:** - All areas have been stock mapped on 1:15000 scale maps and the tracings of the same have been placed in the respective compartment history files.

The results of stock mapping are tabulated as under in Table 2.3.3.

**Table 2.3.3. Range wise Analysis of Stock Mapping (ha)**

<b>Species.</b>	<b>Palampur.</b>	<b>Bajnath.</b>	<b>Total.</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Ban-oak.	2,454.82	184.11	2,638.93
Chil.	61.82	29.13	90.95
Misc. broad-leaved.	134.91	19.43	154.34
Deodar.	2.30	-	2.30
Fir-Spruce.	34.39	-	34.39
Culturable blank.	147.74	26.30	174.04
Un culturable blank.	414.33	-	414.33
<b>Total.</b>	<b>3,250.31</b>	<b>258.97</b>	<b>3,509.28</b>

**2.3.7.2. AGE-CLASSES:** - The stands are generally irregular and younger age classes are deficient except Depot Felling Series where, it is better but not sufficient.

**2.3.7.3. DENSITY:** - Canopy density has been assessed occularly and recorded in the respective compartment history files. The density in the forests of Depot felling Series is better 0.4 to 0.7 than of those in Preservation Felling Series, where it is much less than 0.3.

**2.3.7.4. ENUMERATIONS AND THEIR RESULTS:** - In Depot Felling Series total enumeration of Ban oak trees and important broad-leaved species has been carried our in 10 cm. diameter classes. In Preservation Felling Series enumeration has been done by stratified random sampling with compartment / sub-compartment as a unit. The results of enumeration of each compartment / sub-compartment are recorded in respective compartment history files and appended in Appendix II. However, P.B. wise enumeration results of Ban oak, volume, and number of trees as well as volume per ha are given as under in Table: 2.3.4 and 2.3.5.

**Table: 2.3.4. Enumeration Results (Depot Felling Series).**

P.B.	Area (ha.)	No. of trees.									
		V	IV	III	IIA	IIB	IA	IB	IC	ID	Total.
1	2	3	4	5	6	7	8	9	10	11	12
I	114.11	9548	7298	4314	1843	1053	820	308	276	140	25600
II	129.50	16390	11606	7852	3283	1735	977	433	299	500	43075
III	125.86	20844	13174	6967	3221	1579	821	455	196	396	47653
IV	95.90	26262	6444	3990	1726	949	635	396	189	224	40815
<b>Total</b>	<b>465.37</b>	<b>73,044</b>	<b>38,522</b>	<b>23,123</b>	<b>10,073</b>	<b>5,316</b>	<b>3,253</b>	<b>1,592</b>	<b>960</b>	<b>1,260</b>	<b>15,71,43</b>
<b>No. of trees per ha.</b>		<b>157</b>	<b>83</b>	<b>50</b>	<b>22</b>	<b>11</b>	<b>7</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>338</b>

**Table: 2.3.5. Volume of Ban Oak in cum (Depot Felling Series)**

Dia. classes	Periodic Blocks			
	I (114.11 ha)	II (129.50 ha.)	III (125.86 ha.)	IV (95.90 ha.)
1	2	3	4	5
V	286.44	491.70	625.32	787.86
IV	1,532.58	2,443.26	2,766.54	1,353.24
III	3,235.50	5,889.00	5,225.25	2,992.50
IIA	2,709.21	4,826.01	4,734.87	2,537.22
IIB	2,464.02	4,049.90	3,694.86	2,220.66
IA	2,763.40	3,292.49	2,766.77	2,139.95
IB	1,398.32	1,965.82	2,065.70	1,797.84
IC	1,253.04	1,357.46	889.84	858.06
ID	635.60	2,270.00	1,797.84	1,016.96
<b>TOTAL</b>	<b>16,278.11</b>	<b>26,585.64</b>	<b>24,566.99</b>	<b>15,704.29</b>
<b>Vol. per ha.</b>	<b>34.978</b>	<b>57.136</b>	<b>52.790</b>	<b>33.745</b>

**2.3.8. SILVICULTURAL SYSTEM:** - The forest of Depot Felling Series has been managed under “Punjab Shelter-wood System” in the past. Since the moratorium on felling of Ban oak, no exploitation of green trees is being done. Keeping this in view and also considering the objects of management, no silvicultural felling are proposed. However, for academic interest the forests of Depot felling series shall be managed under Punjab Shelter-wood System” as in the past. Regeneration will be obtained by artificial means. The forests under preservation series will remain under protection. Culturable blanks and the areas having density below 0.3 will be closed and planted with Ban-oak.

**2.3.8.1. CHOICE OF SPECIES:** - Ban-oak will be the main species and will be favoured through both, natural and artificial regeneration. Kail, Deodar, Tun, Khirk, Maral, etc; wherever occurring, will not be unnecessarily sacrificed. In lower blank areas *Quercus serata* will be introduced.

**2.3.8.2. ROTATION AND CONVERSION PERIOD:** - Rotation of 120 years, in keeping with the requirements of the rotational closure scheme is adopted. The crop diameter at this age is 35 cm, suitable for yielding both fuel wood and small

timber. The forests under the Depot Felling Series have been under conversion to uniform since 1921 with a conversion period of 120 years. More than half of this period has expired and the rate of conversion is generally satisfactory.

**2.3.9. ALLOTMENT TO PERIODIC BLOCKS:** - The rotation of 120 years is divided into four periods of 30 years each. Two periods have already elapsed and third commenced from First April 1981 is undergoing. Allotment to all the four periodic blocks has been made. The following Table: 2.3.6 summarises the allotment of area to different periodic blocks:

**Table: 2.3.6. P.B. wise and Range wise Area (Depot Felling Series)**

Range	Area in ha.				Total
	P.B.- I	P.B.- II	P.B.- III	P.B.- IV	
1	2	3	4	5	6
Palampur	89.42	118.57	99.15	86.19	393.33
Bajnath	24.69	10.93	26.71	9.71	72.04
<b>Total</b>	<b>114.11</b>	<b>129.50</b>	<b>125.86</b>	<b>95.90</b>	<b>465.37</b>

The Periodic Block wise abstract of ban oak trees in Depot Felling Series its volume is given in Table: 2.3.7 as under:

**Table: 2.3.7. Periodic Block wise abstract of Ban oak trees in Depot felling Series**

P.B.	Area (ha.)	V	IV	III	IIA	IIB	IA	IB	IC	ID	Total
1	2	3	4	5	6	7	8	9	10	11	12
<b>I</b>	<b>114.11</b>										
	No.	9548	7298	4314	1843	1053	820	308	276	140	25600
	Vol.	286.44	1532.6	3235.5	2709.2	2464	2763	1398.32	1253.04	635.6	16277.70
<b>II</b>	<b>129.5</b>										
	No.	16390	11606	7852	3283	1735	977	433	299	500	43075
	Vol.	491.7	2437.3	5889	4826	4059.9	3292	1965.82	1357.46	2270	26589.18
<b>III</b>	<b>125.86</b>										
	No.	20844	13174	6967	3221	1579	821	455	196	396	47653
	Vol.	625.32	2766.5	5225.3	4734.9	3694.9	2767	2065.7	889.84	1797.84	24567.30
<b>IV</b>	<b>95.9</b>										
	No.	26262	6444	3990	1726	949	635	396	189	224	40815
	Vol.	787.86	1353.2	2992.5	2537.2	2220.7	2140	1797.84	858.06	1016.96	15704.32
<b>Total</b>	<b>465.37</b>										
	No.	<b>73044</b>	<b>38522</b>	<b>23123</b>	<b>10073</b>	<b>5316</b>	<b>3253</b>	<b>1592</b>	<b>960</b>	<b>1260</b>	<b>157143</b>
	Vol.	<b>2191.32</b>	<b>8089.6</b>	<b>17342.30</b>	<b>14807.30</b>	<b>12439</b>	<b>10962</b>	<b>7227.68</b>	<b>4358.4</b>	<b>5720.4</b>	<b>83138.52</b>

**2.3.10. CALCULATION OF YIELD:** - Since no fellings have been prescribed, yield would be of academic interest only. Only dead, dying, diseased, uprooted and fallen trees are to be removed.

The annual yield calculated for the Depot Felling Series according to Simmon's modification of Von Mantel formula is calculated as under: -

$$\text{Annual Yield } Y = \frac{2R}{R^2 - X^2} \times V$$

Where  $Y$  = Annual yield

$V$  = Volume of growing stock measured

$R$  = Rotation

$X$  = Age corresponding to diameter to which the growing stock is measured.

Here  $X = 30$

$V = 83138.52 \text{ m}^3$

$R = 120$

Therefore,  $Y = \frac{2 \times 120 \times 83138.52}{(120)^2 - (30)^2} \text{ m}^3$

$Y = 1421.55 \text{ m}^2$  or say = 14,00  $\text{m}^3$

**2.3.10.1 YIELD FROM P.B.I:** - The annual yield calculated for this Periodic Block by Hufgnal's formula is as under:

$$Y = \frac{C_1 V_1 + C_2 V_2}{P}$$

Where  $Y$  = Average annual yield in  $\text{m}^3$ .

$C_1$  = Constant representing the fraction of volume of trees of class IIA & above that will be available for felling i.e. 0.8

$V_1$  = Corresponding Volume of trees 40 cm dbh and above (II & above)

$C_2$  = Constant representing the fraction of volume of trees of classes III & IV, that will be available for felling, i.e. 0.2

$V_2$  = Corresponding Volume of trees of 20-40 cm dbh (class III and IV)

$P$  = Plan period i.e 15 years.

Accordingly the average yield works out to be:

$$\begin{aligned} Y &= \frac{80\% \text{ of } 11223.16 + 20\% \text{ of } 4768.10}{15} \\ &= \frac{8978.52 + 953.62}{15} \\ &= \frac{9931.78}{15} = 662.11 \text{ M}^3 \end{aligned}$$

**2.3.10.2. YIELD FROM P.B.IV:** - The annual yield calculated for this Periodic Block by Hufgnal's formula is as under:

$$Y = \frac{C_1V_1 + C_2V_2}{P}$$

Where

Y = Average annual yield in m<sup>3</sup>.

C<sub>1</sub> = Constant representing the fraction of volume of trees of class IIA & above that will be available for felling i.e. 0.8

V<sub>1</sub> = Corresponding Volume of trees 40 cm dbh and above (II & above)

C<sub>2</sub> = Constant representing the fraction of volume of trees of classes III & IV, that will be available for felling, i.e. 0.2

V<sub>2</sub> = Corresponding Volume of trees of 20-40 cm dbh (class III and IV)

P = Plan period i.e 15 years.

Accordingly the average yield works out to be:

$$\begin{aligned} Y &= \frac{80\% \text{ of } 10570.76 + 20\% \text{ of } 4345.70}{15} \\ &= \frac{8456.60 + 5869.14}{15} \\ &= \frac{9325.74}{15} = 621.71 \text{ M}^3 \end{aligned}$$

**2.3.11. METHODS OF EXECUTING FELLINGS IN P.B.I:** - The object of fellings in this periodic block is to replace the existing mature and over mature stock of ban oak by even aged young crop. Ban oak is a moderate light demander. Natural germination can take place under heavy shade; a moderate shade is necessary for survival of the seedlings during earlier stages, which can withstand shade for a time, after which it requires more light for its subsequent growth. The following marking rules are thus, laid down for fellings in P.B. I areas: -

(i) About 40-50 seed bearers per ha shall be retained. Where only small sized or heavily lopped trees are available the number of seed bearers should be increased to 60 trees per ha.

(ii) In selecting the seed bearers, trees past middle age to mature with large crown and long clean boles shall be preferred. These should be located on commanding spurs and should be evenly distributed as far as possible.

(iii) Compact well stocked groups of poles, of at least 0.2 ha. in extent, shall be retained as part of the future crop. Such groups will be thinned along with the main thinning. All growth of seedling and sapling stage shall retained.

(iv) No tree under 30 cm. d.b.h. shall be felled, and will be retained till the regeneration is well established.

(v) On steep and precipitous ground and along the banks of nallas the marking shall conform to selection type.

(vi) A judicious mixture of other broad-leaved species shall be maintained. Healthy trees of Walnut, Maral, Horse chestnut, Khirk, Acer and Toon etc. shall not be felled except for inducing regeneration. Over-mature; diseased trees of Rhododendron and other miscellaneous species shall be removed unless occurring in blanks.

(vii) Final fellings shall not be carried out till the area is fully regenerated and the young crop is at least 2m high. About five trees per ha. should be retained at the time of final fellings to meet the demands of right holders.

(viii) The trees must be thoroughly lopped before felling in order to minimize damage to the existing young crop.

#### **2.3.11.1. METHODS OF EXECUTING FELLINGS IN P.B.IV: -**

(i) Trees standing over the established regeneration will be removed to free the young crop.

(ii) The young crop shall be properly cleaned and thinned. The dense patches of advance growth shall also be thinned.

(iii) All dead, drying, diseased trees shall be removed.

**2.3.11.2. METHODS OF EXECUTING FELLINGS IN P.B.II & III: -** No fellings except some conservative fellings to meet the requirement of right holders are prescribed. While carrying out such markings dead, dying, diseased and inferior trees should be removed first.

**2.3.12. SEQUENCE OF FELLINGS IN P.B.I:-** Since no yield is prescribed to be removed from commercial point of view from this working circle, hence no need to layout sequence of fellings.



**2.3.13. SUBSIDIARY SILVICULTURAL OPERATIONS IN P.B.I:** - These operations will be as under: -

**2.3.13.1. Subsidiary Fellings:** - All marked and other damaged trees left un-felled should be cut and allowed to be removed by the local people. The felling refuse and debris, if any left after charcoal burning, should be dumped in the nalla and depressions.

**2.3.13.2. Sowing and Plantings:** - All the felled P.B. I areas of Depot Felling Series, and under-stocked (density 0.3 and below) and blank areas in the Preservation Felling Series are to be restocked artificially mainly with Ban oak. The felled areas will be taken up for regeneration immediately after subsidiary fellings and other subsidiary operations; no separate programme is, therefore, required for these areas.

For areas of Preservation Felling Series sowing / planting programme is laid down in Table: 2.3.8 & 2.3.9 as under: -

**Table: 2.3.8. Sequence of Sowing and Planting in Blanks.**

Year	Range	Name of forest	Comptt./ sub.Comptt.	Total area in ha.	Area to be Planted.
1	2	3	4	5	6
2010-11	Palampur	P.14P. Kandbari	2a	37.64	6.48
	-do-	U.12P. Bagh	2	28.73	4.05
2011-12	-do-	P.14P. Kandbari	2c(ii)	22.66	6.48
	-do-	U.11P. Kandrachu- Nal	Whole	126.24	6.07
2012-13	-do-	P.14P. Kandbari	4a	105.20	7.00 (Part)
	-do-	P.15P. Bhagpur	1	33.18	4.86
2013-14	-do-	P.14P. Kandbari	4b	95.08	5.50
	-do-	P.14P. Kandbari	3a	33.18	8.90
2014-15	-do-	U.12P.Bagh.	1	131.09	10.00(Part)
2015-16	-do-	P.14P. Kandbari	4a	105.20	7.57 (Part)
	-do-	U.36P.Sethu--ka-Nal.	1	107.63	8.00 (Part)
2016-17	-do-	U.12P.Bagh.	1	131.09	10.00(Part)
2017-18	Bajnath.	U.25B. Ban-Deol	5a	66.76	9.00 (Part)
2018-19	-do-	U.12P.Bagh.	1	131.09	10.00(Part)
2019-20	Bajnath.	U.25B. Ban-Deol	5a	66.76	8.40 (Part)
2020-21	-do-	U.12P.Bagh.	1	131.09	10.00(Part)
2021-22	-do-	P.15P. Bhagpur	2	24.28	8.09
	-do-	U.36P.Sethu--ka-Nal.	4	27.92	8.00
2022-23	-do-	U.12P.Bagh.	1	131.09	10.25(Part)
2023-24	-do-	P.16P. Supdhar	4	644.13	8.09
	Bajnath.	U.25B. Ban-Deol	5b	36.42	4.90(Part)
2024-25	-do-	U.36P.Sethu--ka-Nal.	1	107.63	8.00 (Part)
	Bajnath.	U.25B. Ban-Deol	5b	36.42	4.00 (Part)

**Table: 2.3.9. Sequence of Sowing and Plantings in poorly stocked areas.**

Year	Range	Name of forest	Comptt./ sub.Comptt	Total area in ha.	Area to be Planted.
1	2	3	4	5	6
2010-11	Palampur	U.P.8P. Bhagpur	Whole	14.16	14.16
2011-12	-do-	U.11P. Kandrachu Nal	Whole	126.24	20.00(Part)
2012-13	-do-	U.34P. Kalaban	1	63.74	20.00(Part)
2013-14	-do-	U.11P. Kandrachu Nal	Whole	126.24	20.00(Part)
2014-15	-do-	U.12P. Bagh.	1	131.09	20.00(Part)
2015-16	-do-	U.34P. Kalaban	1	63.74	20.00(Part)
2016-17	-do-	U.12P. Bagh.	1	131.09	20.00(Part)
2017-18	-do-	U.11P. Kandrachu Nal	Whole	126.24	20.00(Part)
2018-19	-do-	U.34P. Kalaban	1	63.74	15.93(Part)
2019-20	-do-	U.12P. Bagh.	1	131.09	20.00(Part)
2020-21	-do-	U.36P.Sethu-- ka-Nal.	4	27.92	16.28
2021-22	-do-	U.12P. Bagh.	1	131.09	20.84(Part)
2022-23	-do-	U.11P. Kandrachu Nal	Whole	126.24	20.92(Part)
2023-24	-do-	U.12P. Bagh.	2	28.73	17.68(Part)
2024-25	-do-	U.12P. Bagh.	2	28.73	7.00(Part)
	-do-	U.34P. Kalaban	1	63.74	8.00(Part)

**2.3.13.3. Weeding and Bush-cutting:** - The existing natural seedling and sapling growth will be carefully examined and excess growth of miscellaneous species hampering regeneration of oak will be removed. In the planted areas, one weeding a year will normally be sufficient. Grass and shrub growth suppressing the young regeneration should be removed. Unnecessary shrub cutting should, however, be discouraged, as such growth protects the young crop from frost and sun.

**2.3.13.4. Cleaning and Thinnings:** - The dense patches of young regeneration and coppice shoots shall be properly cleaned. All suppressed and sick seedlings in such patches shall be removed. Every thinnings may not be necessity in most of the areas but should invariably be carried out whenever necessary, at the discretion of Divisional Forest Officer.

**2.3.14. TECHNIQUES OF ARTIFICIAL REGENERATION OF BAN OAK:** - Ban oak may be raised artificially either by direct sowing or by nursery raised seedlings. The winter or early spring is the best season for direct sowing. However, direct sowing is to be avoided as far as possible and planting should be preferred. The nursery techniques for Ban oak are described briefly as under: -

**(i)Soil Preparation:** - Seed beds should be, as far as possible, of uniform size of 1 m. width and up to 10 m. length with about 40 cm. wide foot-path in between. The terraces should be dug up thoroughly. Before digging sand, humus

and farmyard manure is spread on the terraces to improve the texture and structure of soil. Aldrine powder should be dusted with the final digging to protect the seedlings from termite attack. Chemical fertilizers, N.P.K. and super phosphate, are also added to the soil. The terraces are leveled and divided into seedbeds.

**(ii) Seed Collection, Pretreatment and Sowing:** - The seed is collected in November: dried and sown in the nursery soon after. There are about 600 seeds per kg. Before sowing, the seeds are pre-treated by soaking in warm water for about 24 hours. The seeds after pre-treatment are dipped in Bavistin solution (1gm in 1 liter water) for 5 minutes to prevent them from fungal attack. The seeds are sown, about 2 cm. deep at a distance of about 10 to 12 cm. in 25 cm. spaced lines, in raised beds during November/December. The lines are covered with sand for easy germination. The seedbeds are then mulched with dry grass. The mulching helps in retention of moisture, keeps the weeds low, prevents sheet erosion and thereby does not allow the germinated seeds and small seedlings to wash away or dismantle from the soil by heavy rains. The germination starts after 20-25 days and is complete in about 35-40 days. Germination percentage is about 75 % if seed is sown fresh. Weeding/hoeing is done every fortnight during the first six months and afterwards one weeding every month is sufficient.

**(iii) Irrigation, Fertilizers and Chemicals:** - After the seedlings are about 8cm. high the beds are flood irrigated every week till the onset of monsoon. Fortnightly irrigation is given during September-November. Urea and N.P.K. are applied to the beds at the rate of 30 gm per square meter generally every fortnight in the growing season up to the end of September. Insecticides and fungicides viz. Bavistin, Aldrex, Matacid etc. are sprayed or dusted from time to time.

**(iv) Transplanting:** - The seedlings are transplanted from the seedbeds in next January, i.e. about 12-13 months after sowing, when the plants are dormant. The seedlings are uprooted from the seedbed with pick-axes and spades. The main taproot is clipped and the injured lateral roots are pruned. The clipping and pruning of roots helps the plants to develop a good lateral fibrous root system. The shoot is also clipped at a height 7-8 cm from the collar. The object of clipping of the shoot is to arrest the initial growth of the plants when the roots have not established themselves in the beds and yet also to reduce the transpirational losses. Such pruned seedlings are then transplanted in the beds prepared in the same way as the seedbeds are a spacing of 30cmX15cm. The seedlings are given a dip into Bavistin solution before transplanting. Mulching is done in the beds after transplanting.

**(v) Planting in the Field:** - Normally 2 year old plants with well developed root system when these are about 25cm in height are ready for planting in the field. The plants below this size are allowed to grow for the next growing season. Root-Shoot cuttings are prepared in the month of January-February by pruning the damaged roots and clipping the roots at a height of about 15cm the cuttings are then dipped in Bavistin solution before sending them to the planting site. The planting is done in pits 30cm X 30cm X 30cm at a spacing of 2cm X2cm. Entire plants 2 ½ years old can also be planted during rainy season.

**2.3.15. CULTURAL OPERATIONS IN P.B.IV:** - Mechanical thinning shall be carried out along with the main fellings and thinning wherever necessary. Cleanings and stick thinning will generally be necessary in natural regeneration from time to time. The right holders will generally remove the available material. Even though, the disposal of such cut material involves certain expenditure, the same will, undoubtedly, be repaid in course of time by accelerated increment of the crop.

**2.3.16. MISCELLANEOUS REGULATIONS:** - Other miscellaneous regulations for these forests are given as under: -

**2.3.16.1. Closures:** - All P.B.I areas will remain closed irrespective of the fact whether any seeding fellings have been carried out or not. This will help in restoration and inducement of natural regeneration. The areas of Preservation Felling Series which are taken up for sowing/planting shall be closed at least for 20 years. All other areas will remain open to grazing and other rights.

**2.3.16.2. Grass Cutting:** - Grass-cutting will be strictly prohibited in all P.B.I and other plantation areas till the young crop is beyond the danger of damage. In areas where grass and shrub growth becomes very dense and is actually interfering with the regeneration or becomes a fire hazard, grass cutting may be allowed under strict supervision.

**2.3.16.3. Fire-Protection:** - Though fires are not of considerable consequence in these forests, the regeneration areas must be protected against fires. Charcoal burning in felled areas may some times become source of fire and cause damage to the existing natural young crop. This must receive proper attention.

**2.3.16.4. Lopping and lopping rules:** - Lopping will not be permitted in P.B. I areas. In the remaining areas the lopping rules should not be allowed to remain as rituals but should be strictly enforced. To avoid the harmful effects of indiscriminate and uncontrolled loppings, the following lopping rules are formulated for strict compliance and to maintain the forests in good condition.

(i) Trees should be lopped on rotation of 3 years lopping cycle.

(ii) The use of axes and other heavy sharp instruments for lopping should not be allowed. Only light sickles with blades not longer than 25 cm. generally used for cutting grass should be allowed.

(iii) The lopping of any tree under 30-cm. d.b.h. should be restricted.

(iv) The lopping of the upper 1/3<sup>rd</sup> of the crown of a tree should be prohibited and the leading branch-lets on each branch should be retained.

(v) The cutting of branches over 2.5-cm. in diameter or 7.5 cm. in girth should be prohibited.

(vi) If there is any climber on the tree, it must be cut back at the base by loppers. It has been found that loppers commonly lop a tree and leave the climbers on the tree as such. This practice should be discouraged.

(vii) Lopping should be prohibited except during the lopping season i.e. from 1st November to 31<sup>st</sup> March.

(viii) Walnut, maple and bird cherry trees should not be looped.

**2.3.17. Exercise of other Rights:** - Exercise of recorded rights will be allowed subject to the restrictions imposed in the closed areas. Mother trees standing over the young crop and trees available in thinning in P.B.IV areas should preferably be removed to meet the demands of right holders from areas other than P.B.-IV. In such cases, trees may be given from other areas but marking must be strictly on silvi-cultural principles.

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## CHAPTER-IV

### PLANTATION WORKING CIRCLE

**2.4.1. GENERAL CONSTITUTION AND CHARACTER OF THE VEGETATION:** - This working circle comprises of young plantations, blanks and the areas, which are under-stocked or stocked with miscellaneous scrub species, sparse tree growth in isolated as well as in patchy form, interspersed with blanks or totally blank areas in all categories of forests. The total area of this working circle is 9,480.84 ha. The character of vegetation has been described in **Para 1.2.3. Chapter-II (Part-I)**.

**2.4.2. BLOCKS AND COMPARTMENTS:** - The boundaries of the forest blocks remain the same as in the plan under revision. The compartments and sub-compartments also remain, for the most part, as in the previous plan except that a few sub-compartments have been formed out of existing bigger compartments to facilitate concentrated working. All the compartments and sub-compartments are distinguishable on the ground. The details of such new sub-compartments have been given in **para 2.1.16. Chapter-I (Part-II)**.

**2.4.3. PLANTATION SERIES:** - Four plantation series have been constituted as per legal status of the forests with regard to closures, and their control as described under:

**(i)** Rotational Closures Plantation Series (Plantation Series-I): - This comprises of the Delimited Protected Forests.

**(ii)** Voluntary Closures Plantation Series (Plantation Series-II): - This constitutes of Un-delimited Protected and Un-classed Forests.

**(iii)** C.F.S. Plantation Series (Plantation Series-III): - This consists of the forests covered under the name of C.F.S.

**(iv)** Roadside Plantation Series (Plantation Series-IV): - This comprises of railway roadside strips. It is further sub-divided in to:

**(a)** Plantations Series-IV a: - It consists of all the State High Way and National High Ways falling with-in the jurisdiction of Palampur division.

**(b)** Plantation Series-IV b: - It includes the land of Northern Railway along railway tracts as the same has been declared Protected Forests and the provisions of Chapter-IV of Indian Forest Act 1927 are applicable to such land as per Punjab Govt. Notification No. 112-58/1195 dated 03.5.1958. The planting works on both

sides of the track in between stations are entrusted to the Forest Departments of the concerned states. The Pricing Sub-Committee meeting of the Central Board of Forestry held on 25.10.90 decided that the state Forest Department should avail of offer of the railway to lease such land on a nominal rent of Rs. 1/- per year per ha. to grow trees on such strips.

**2.4.4. SPECIAL OBJECTS OF MANAGEMENT:** - The special objects of management are:

(i) To nurse the young plantations and natural young growth under a systematic regime of cleanings and thinning.

(ii) To restock the existing blanks, open and degraded forests with economic species.

(iii) To replace gradually the inferior scrub forests with more valuable commercial tree species.

(iv) To raise compact plantations to meet the requirements of local population for fuel, fodder, fruits, small timber etc.

(v) To afforest the barren areas to preserve the soils in situ and conserve the moisture in the catchments.

(vi) To restock the blanks of railway and roadside stripes with species of aesthetic importance.

**2.4.5. AREA AND ALLOTMENT:** - The total area of this working circle is 9,480.84 ha. with 2,471.73 ha. area under broadleaved species. The detailed distribution of individual forests by ranges, compartments and sub-compartments is given in Annexure-I. The range wise abstract in each plantations series is produced as under in Table: 2.4.1.

**Table: 2.4.1. Allotment of areas into Plantation Series**

Plantation Series.	Class of Forest.	Range wise area in ha.			Total
		Baijnath	Droh	Palampur	
1	2	3	4	5	6
I	D.P.F.	168.51	510.79	328.07	1,007.37
II	U.P.F.	750.50	3,445.33	2,169.80	6,365.63
	U.F.	722.69	-	315.01	1,037.70
III	C.F.S.	-	548.60	521.54	1,070.14
	<b>Total</b>	1,641.70	4,504.72	3,334.42	9,480.84

## 2.4.6. ANALYSIS AND EVALUATION OF CROP:

**2.4.6.1. STOCK MAPS:** - All the compartments and sub-compartments have been stock mapped on 1:15,000 scale maps and posted in the concerned compartment history files. The abstract of area under each species is given as under in Table: 2.4.2.

**Table: 2.4.2. Stocking and area statement in ha.PLANTATION- SERIES-I**

Range.	Chil.	Ban-oak.	Misc. B.L.	C.B.	U.C.B.	Total.
Palampur.	73.36	32.29	53.26	169.16	-	328.07
Baijnath.	24.76	-	59.31	75.94	8.50	168.51
Droh.	93.91	-	302.51	112.37	2.00	510.79
Total.	192.03	32.29	415.08	358.01	10.50	1,007.37

### PLANTATION-SERIES-II

Range.	Chil.	Ban-oak.	Misc. B.L.	Deo.	C.B.	U.C.B.	Total.
Palampur.	909.18	37.38	177.79	2.00	1,342.18	16.28	2,484.81
Baijnath.	383.24	3.59	542.54	-	538.82	5.00	1,473.19
Droh.	865.26	-	979.92	-	1,482.06	118.09	3,445.33
Total.	2,157.68	40.97	1,700.25	2.00	3,363.06	139.37	7,403.33

### PLANTATION-SERIES-III

Range.	Chil.	Misc. B.L.	C.B.	U.C.B.	Total.
Palampur.	139.79	107.11	274.64	-	521.54
Baijnath.	-	-	-	-	-
Droh.	120.63	249.29	178.68	-	548.60
Total.	260.42	356.40	453.32	-	1,070.14

**2.4.6.2. SITE-QUALITY AND AGE CLASSES:** - In miscellaneous broad-leaved and scrub forests, the trees of various species of all age groups are found mixed with each other. The site quality is poor and tree growth is restricted. These forests are generally variable in age with preponderance of middle aged and very few matured trees.

**2.4.6.3. DENSITY:** - The density has been estimated occularly and recorded in individual C.H. files. Most of the area is either blank or having only bush growth. The miscellaneous broad-leaved and scrub forests are variable in stocking. The average density of these forests is between 0.3 to 0.5 rest of the forests are either blank or have density below 0.1.

**2.4.6.4. ENUMERATIONS:** - Enumerations of Chil, Khair and other economically important species have been carried out randomly and results recorded in the respective C.H. file. The trees were measured in 10 cm. diameter classes down to 10-cm. d.b.h. The unit of enumeration sampling was compartment/sub-compartment. However enumerations in scrub forests were carried out by 5%



partial stratified random sampling; as the control of yield being is by area, these were not required. The position of growing stock in this working circle is as under in Table: 2.4.3.

**Table: 2.4.3. Position of Growing Stock**

Species	Average G.S./ha. in cum.	Total area in ha.	Total G.S. in cum.
1	2	3	4
Conifers.	79.77	9,480.84	7,56,299.67
Broad leaved.	165.94	9,480.84	15,73,258.90

**2.4.7. SILVICULTURAL SYSTEM:** - The scrub forests will be worked under “Modified Clear-Felling” system with artificial regeneration. About 30-40 trees/ha well distributed over the area, having a diameter of 15 cm. and above preferably of seedling origin of valuable species like Chil, Khair. Sain, Shisham, Toon, Harar, Bahera, Bamboo etc. shall be retained as standard for seed, shade, for protection of site and to meet right holders demand for timber, fodder and fruit etc. The rest of the area however, not be clear felled for planting and whatever tree growth of some economic importance exist, should be retained for the purpose mentioned above. Only the areas are to be cleared bushes and unwanted growth to pave the way for artificial regeneration.

**2.4.8. CHOICE OF SPECIES:** - The less valuable species shall be replaced by more valuable species like Khair, Shisham, Chil, and Bamboo etc. On higher elevation Chil should be preferred and down below Khair, Shisham will be planted. Bamboo planting shall be confined to fertile pockets in lower elevations along the nallas and rivers. In the areas close to habitations, species yielding fuel, fodder, fruit etc. such as Dhaman, Kachnar, Ohi, Robinia, Leucaena, Dheu, Harar, Bahera, Ritha, Banni (*Quercus serrata*) Ban-oak, Walnut etc. will be planted. Choice of species for a particular area will be decided by the existing natural vegetation, site factors, silviculture of species, market and local demands and of course the policy of the Government. In Plantation Series-IV Arjun, Ritha, Jacaranda, Silver oak, Cassia, Acacias etc shall be planted along roadside. Similarly species such as Kachnar, Ritha, Robinia, Ohi, Leucaena, Dheun, Sain, Amla etc will be planted in railway strips for meeting the requirement of the local people along-with ornamental plants. The species recommended for planting in different areas are broadly indicated in Table 2.4.4.

**Table: 2.4.4. Altitudinal zones and species recommended for planting.**

Altitudinal Zones	Species Recommended
Upto 750 m. i.e. Lower regions	Khair, Siris, Shisham, Bamboo, Dhaman. Kachnar, Sain, Toon, Harar, Bahera, Ritha, Dheun, Amla, Mulberry, Mango etc.
750-1,600 m. i.e. Middle regions	Chil, Ohi, Bamboo, Khirak, Dhaman, Poplars, Toon, Robinia, Kachnar, etc.
1,600-2,500 m. Higher regions.	Deodar, Kail, Fir/spruce, Poplars, Walnut, Horse Chest Nut, Mapple, Birdcherry etc.

**2.4.9. ROTATION AND CONVERSION PERIOD:** - Since the plantations raised in this working circle are not likely to mature during the currency of this working plan, no rotation and conversion period is prescribed at this stage. In case of Bamboos on private land, rotation has reference to the individual culm and not clump. The clump attains its entire height and thickness during the first year of its growth and deterioration starts in about the fifth year. The life of culm on average is six years. Three years old bamboos are marketable but not much liked. Four to five years old bamboos find good market. Older bamboos are not liked, as they are not easy to work due to hardening of wall on account of silica deposition. Old and dry bamboos are fit for fuel only. In view of this, the culms four to five years old should be felled. Since bamboos shows signs of deterioration after five years as such a felling cycle of four years is prescribed. This will also allow adequate time for the new “manus” to establish and develop.

**2.4.10. REGENERATION PERIOD:** - A regeneration period of 30 years is sufficient for deodar, kail, chil and other high level broad-leaved and conifers. For broad-leaved species in lower regions 10 to 15 years period will suffice. This may be taken as 15 years equal to the period of plan.

**2.4.11. CALCULATION OF YIELD:** - The control of yield / fellings in broad-leaved scrub forests will be regulated by area. However, area available for felling is not of considerable extent. The Compartment/sub-compartments of less than five ha. area under broad-leaved scrub forests have not been proposed for felling. For the purpose of convenience a complete compartment / sub-compartment has been prescribed for felling except for bigger compartments to be worked in 2 to 5 years. A deviation of 10% (+) or (-) in the prescribed area is allowed. A five year check should however, be applied so that excess / deficit fellings do not take place. Fellings will follow the successful plantations. If regeneration does not keep pace, fellings will be stopped.

**2.4.12. SEQUENCE OF FELLING:** - Felling series wise sequence of felling in this working circle is given as under in Para: 2.4.12.1.

**2.4.12.1. SEQUENCE OF FELLING:** - Felling Series-wise sequence of felling is given as under in Table: 2.4.5, Table: 2.4.6 and Table: 2.4.7.

**TABLE: 2.4.5. PLANTATION-SERIES-I**

Year	Range	Name of forests	Comptt/ sub.Comptt.	Total area in ha.	Area to be felled in ha.
1	2	3	4	5	6
2010-11	Bajnath	P.13B. Baggidhar	3b	9.71	6.21
	Palampur	P.27P. Khatin	3	13.75	8.25
	Droh	P.23P. Kurang	3b	10.52	10.52
2011-12	Bajnath	P.75B. Chamb	Whole	62.28	12.95
	Droh	P.23P. Kurang	1c	14.56	14.56

2012-13	Palampur	P.27P. Khatin	2	16.19	12.70
	Droh	P.39P. Bichhwai	2a	12.14	12.14
2013-14	Droh	P.23P. Kurang	1a	7.69	7.69
	-do-	-do-	1b	16.19	16.19
2014-15	Palampur	P.35P.Junga-Devi	1	29.54	12.54
	Droh	P.50J. Molag	Whole	24.34	14.00
2015-16	Bajjnath	P.76B. Tain	Whole	63.26	28.15
2016-17	Palampur	P.35P.Junga-Devi	2	18.62	6.82
	Droh	P.42J.Dhar-Chhatotariann	2c	19.02	19.02
2017-18	Bajjnath	P.77B. Anirudh	Whole	21.01	12.01
	Droh	P.41J. Dhar-Balakrupi	2a	15.38	15.38
2018-19	Palampur	P.35P.Junga-Devi	3	21.45	5.45
	Droh	P.48J. Traffer	Whole	22.19	20.00
2019-20	-do	P.38P. Baloh	1	11.33	5.73
	-do-	P.41J. Dhar-Balakrupi	1a	9.71	9.71
	-do-	P.45J. Balla	Whole	9.88	9.88
2020-21	-do-	P.38P. Baloh	3	23.47	15.47
	-do	P.41J. Dhar-Balakrupi	1c	16.19	10.19
2021-22	-do-	P.39P. Bichhwai	2b(ii)	7.69	6.48
	-do-	P.41J. Dhar-Balakrupi	2b	9.71	9.71
	-do-	P.47J. Bajot	Whole	9.84	9.84
2022-23	-do	P.46J. Maila	Whole	42.03	27.00
2023-24	-do-	P.49J.Harsi	Whole	38.64	25.00
2024-25	-do-	P.42J.Dhar-Chhatotariann	2b	8.50	8.50
	-do-	P.41J. Dhar-Balakrupi	1b	8.50	8.50
	-do-	P.44J. Ban-Chambi	1b	11.73	6.00
	-do	P.41J. Dhar-Balakrupi	2c	10.93	5.93

**TABLE: 2.4.6. PLANTATION-SERIES-II**

Year	Range	Name of forests	Comptt/ sub.Comp tt.	Total area in ha.	Area to be felled in ha.
1	2	3	4	5	6
2010-11	Bajjnath	U.P.29B.Sakri-Khas	1	19.42	12.00
	-do-	U.P.41B.Sansai-I	2	62.31	30.74
	Palampur	U.P.76P. Jauna-IV	2	100.56	8.00
	Daroh	U.P.43J.Jaisinghpur-II	2a	5.36	5.36
	-do-	U.P.44J.Jaisinghpur-I	2	50.58	22.00
	-do-	U.P.50J.Lahru-Sada	1	30.76	18.00
	-do-	U.P.90P. Garh-Jamula-I	2	25.09	9.00
2011-12	Bajjnath	U.P.40B.Duhak	1	37.64	19.00
	-do-	U.49B.Malghota	Whole	28.33	13.00
	Palampur	U.P.79P. Jauna-I	2	42.48	10(Part)
	Daroh	U.P.43J.Jaisinghpur-II	3	53.22	8.45
	-do-	-do-	9	72.03	35.00
	-do-	U.P.49J.Alampur	10	17.00	17.00

2012-13	Baijnath	U.P.42B. Sansai-II	2	127.53	30.00(Part)
	-do-	U.7B. Bhattu	4	7.69	5.00
	Palampur	U.P.79P. Jauna-I	2	42.48	13.00
	Daroh	U.P.43J.Jaisinghpur-II	6	15.02	12.02
	-do-	U.P.48J. Sakoh	2	10.93	10.93
	-do-	U.P.49J.Alampur	3	59.88	28.00
	-do-	-do-	16	12.95	8.00
2013-14	Baijnath	U.P.42B. Sansai-II	2	127.53	22.53(Part)
	-do-	U.P.110P.Andretta-Khas	1	14.96	14.96
	Palampur	U.P.112P. Naura	2	12.95	7.00
	-do-	-do-	4b	14.97	7.50
	Daroh	U.P.43J.Jaisinghpur-II	7b	21.85	14.00
	-do-	U.P.49J Alampur	21b	44.51	41.01
2014-15	Baijnath	U.P.110P.Andretta-Khas	2	64.74	20.00(Part)
	-do-	U.43B. Bhadrena	1	42.89	7.00
	Palampur	U.P.116P. Rajhoon-I	Whole	292.12	10.00(Part)
	Droh	U.P.43J.Jaisinghpur-II	8b	9.84	6.30
	-do-	U.P.49J.Alampur	4	17.40	17.70
	-do-	-do	19	20.23	12.82
	-do-	U.P.53J. Umri	2	24.28	11.00
	-do	U.P.69P. Salan	Whole	19.02	8.02
	-do	U.P.89P. Garh-Jamula-II	2	39.66	8.00
2015-16	Baijnath	U.P.110P.Andretta-Khas	2	64.74	20.00(Part)
	-do-	U.44B. Ghorpith	1	33.59	21.59
	Palampur	U.P.116P. Rajhoon-I	Whole	292.12	10.00(Part)
	Daroh	U.P.49J.Alampur	6	8.90	8.90
	-do-	-do-	11	35.21	24.21
	-do-	-do-	14	22.66	22.66
2016-17	Baijnath	U.P.110P.Andretta-Khas	2	64.74	24.74(Part)
	-do-	U.5B. Deol.	7a	23.87	11.00
	Palampur	U.P.116P. Rajhoon-I	Whole	292.12	10.00(Part)
	Daroh	U.P.49J. Alampur.	1b	34.79	34.79
	-do-	U.P.46J. Tamber	1	20.23	5.00
	-do-	U.P.63P. Nalehr	1	40.46	23.46
2017-18	Baijnath	U.6B. Paprola	2	163.46	40.00(Part)
	Palampur	U.P.116P. Rajhoon-I	Whole	292.12	10.00(Part)
	Daroh	U.P.46J. Tamber	2	34.40	33.19
	-do-	U.P.57P. Sedun	3	30.35	30.35
2018-19	Baijnath	U.6B. Paprola	2	163.46	40.00(Part)
	Palampur	U.P.113P. Dheera-I	1	31.97	9.57(Part)
	Daroh	U.P.49J.Alampur	1a	50.98	50.98
	-do-	U.P.75P. Purba	1	13.76	7.00
2019-20	Baijnath	U.6B. Paprola	2	163.46	40.00(Part)
	Palampur	U.P.113P. Dheera-I	1	31.97	10.00(Part)
	Daroh	U.P.63P. Nalehr	2	28.33	26.33
	-do-	U.P.68P. Ghaget-Salan	2	10.93	10.93

	-do-	U.P.71P. Gadreter	2	19.43	19.43
	-do-	U.P.57P. Sedun.	2	61.90	6.90
2020-21	Bajjnath	U.6B. Paprola	2	163.46	40.22(Part)
	Palampur	U.P.116P. Rajhoon-I	Whole	292.12	10.00(Part)
	Daroh	U.P.49J. Alampur	2	26.69	14.19
	-do-	U.P.109P. Gadiar	2	23.88	17.88
	-do-	-do-	18	13.35	6.95
	-do-	U.P.54J. Tamber	2	21.45	21.45
2021-22	Bajjnath	U.46B. Beth-Buhli	1	41.27	20.00(Part)
	-do-	U.P.32B. Balh	Whole	20.23	11.63
	Palampur	U.P.114P. Dheera-III	3	83.35	12.00
	Daroh	U.P.89P. Garh-Jamula-II	3	42.89	21.89
	-do-	U.P.104P. Gagahn	2	62.21	39.00
2022-23	Bajjnath	U.46B. Beth-Buhli	1	41.27	20.41(Part)
	-do-	U.6B. Paprola	1	17.00	17.00
	Palampur	U.P.120P. Bhangali	Whole	30.76	10.00
	Daroh	U.P.89P. Garh-Jamula-II	4	47.47	12.00
	-do-	U.P.90P. Garh-Jamula-I	5	24.28	12.00
	-do-	U.P.105P. Pangu	Whole	77.29	35.00(Part)
2023-24	Bajjnath	U.29B. Sakri-Khas	2	7.28	7.28
	-do-	U.4B. Paprola-Khas	Whole	18.62	10.62
	-do-	U.48B. Khara-Nal	1	17.80	8.80
	Palampur	U.P.114P. Dheera-III	2	31.97	6.50
	-do-	U.P.118P. Jharet-Thakran	Whole	62.31	7.00
	Daroh	U.P.90P. Garh-Jamula-I	6b	11.33	7.00
	-do-	U.P.100P. Molag	1	19.42	19.42
	-do-	U.P.105P. Pangu	Whole	77.29	36.24(Part)
2024-25	Bajjnath	U.48B. Khara-Nal	2	52.20	24.00
	-do-	-do-	1	17.80	8.80
	Daroh	U.P.104P. Gagahn	1	22.36	9.36
	-do-	U.P.58P. Ghumarnu	Whole	12.95	12.95
	-do-	U.P.68P. Ghaget-Salan	1	13.76	6.56
	-do-	U.P.107P. Nadli	Whole	60.69	13.00
	-do-	U.P.109P. Gadiar	1	10.12	10.12
	-do-				
	-do-	U.P.45J. Karanghat-Kamand	Whole	27.52	7.00
	-do-	U.P.51J. Dhaniara	4	36.02	5.00
	-do-	U.P.49J. Alampur	22	8.50	5.40

**TABLE: 2.4.7. PLANTATION-SERIES-III**

Year	Range	Name of forests	Comptt/ sub.Comptt.	Total area in ha.	Area to be felled in ha.
1	2	3	4	5	6
2010-11	Palampur	C.F.S. Gaggal	P.13	21.85	10.00(Part)
	Daroh	C.F.S. Maniara	U.P.10	22.26	7.00

2011-12	Palampur	C.F.S. Gaggal	P.13	21.85	9.00(Part)
	Daroh	C.F.S.Punner-Dehan	U.P.11	7.28	7.28
2012-13	Palampur	C.F.S. Gaggal	P.14	18.21	7.41
	Daroh	C.F.S.Punner-Dehan	U.P.9	10.93	10.93
2013-14	Palampur	C.F.S. Gaggal	P.15	17.80	11.80
	Daroh	C.F.S. Balota	U.P.7	5.66	5.66
2014-15	Palampur	C.F.S. Gaggal	U.P.58	6.07	6.07
	Daroh	C.F.S.Dagera	U.P.1	9.31	9.31
2015-16	Palampur	C.F.S. Gaggal	U.P.77	6.88	6.68
	Daroh	C.F.S.Dagera	U.P.12	9.31	9.31
2016-17	-do-	-do-	U.P.2	7.28	7.28
	-do-	C.F.S. Gharana	U.P.2	9.71	9.71
2017-18	-do	C.F.S.Dagera	U.P.3	6.07	6.07
	-do-	C.F.S. Gharana	U.P.3	25.49	10.00
2018-19	-do-	C.F.S.Dagera	U.P.6	11.33	11.33
	-do-	C.F.S. Gharana	U.P.1	5.26	5.26
2019-20	-do-	C.F.S.Dagera	U.P.8	7.28	7.28
	-do-	C.F.S.Punner-Dehan	U.P.19	8.09	8.09
2020-21	-do	C.F.S.Dagera	U.P.9	18.21	13.21
	-do-	C.F.S.Punner-Dehan	P.7	9.71	5.00
2021-22	-do-	C.F.S.Dagera	U.P.15	6.88	6.88
	-do-	C.F.S.Punner-Dehan	U.P.16	9.31	9.31
2022-23	-do-	C.F.S.Punner-Dehan	U.P.14	14.16	14.16
2023-24	-do-	C.F.S.Punner-Dehan	U.P.20	5.66	5.66
	-do-	C.F.S.Punner-Dehan	U.P.30	7.28	5.28
	-do-	C.F.S.Punner-Dehan	U.P.32	9.71	7.00
2024-25	-do-	C.F.S.Dagera	U.P.10	8.50	5.50
	-do-	C.F.S.Punner-Dehan	U.P.26	8.09	5.00

**2.4.13. METHODS OF EXECUTING FELLINGS:-** The following marking rules for fellings in scrub forests are laid down for the guidance of marking officer:

(i) About 40 to 45 trees / ha preferably middle aged, well distributed over the area will be retained for seed, shade and small timber and rest of the vegetation will be clear felled. A record of standards shall be maintained in the compartment History files.

(ii) The trees retained shall comprise of the economically important species like Chil, Khair, Shisham, Sain, Toon, Semal, Harar, Behera, Amla, Bamboo, Quercus species etc.

(iii) Along nallas, ridges and on refractory, erosion prone as well as precipitous areas no fellings shall be carried out.

(iv) Chil and Khair trees wherever existing will not be felled except diseased, rotten, hollowed, dry and fallen.

(v) The height of the stumps should be 10 cm. above the ground level.

(vi) Bamboo clumps if any found in the coupe, shall be thinned and not clear felled.

**2.4.14. SEQUENCE OF PLANTING:** - All the felled areas will be taken up for planting immediately for planting. The sequence of planting of these areas will be the same as sequence of felling given above. In addition to felled areas taken for planting sizeable blanks (5.00 ha. in Plantation Series-I & II and 2.00 ha. in Plantation Series-III) have been identified and Planting programme year-wise is given as under in Table: 2.4.8, Table: 2.4.9. & Table: 2.4.10 respectively.

**TABLE: 2.4.8 PLANTATION-SERIES-I**

Year	Range	Name of forests	Comptt./ sub.Comptt.	Total area in ha.	Area to be planted in ha.
1	2	3	4	5	6
2010-11	Bajjnath	P.75B. Chhamb	Whole	62.28	5.83(Part)
	Palampur	P.35P. Jhunga-Devi	1	29.54	8.00
	Daroh	P.23P. Kurang	4a	12.95	5.00(Part)
2011-12	Bajjnath	P.75B. Chhamb	Whole	62.28	5.00(Part)
	Palampur	P.35P. Jhunga-Devi	2	18.62	9.88
	Daroh	P.23P. Kurang	4a	12.95	7.95(Part)
2012-13	Bajjnath	P.75B. Chhamb	Whole	62.28	5.00(Part)
	Palampur	P.35P. Jhunga-Devi	3	21.45	10.00(Part)
	Daroh	P.23P. Kurang	4b	21.45	5.00(Part)
2013-14	Bajjnath	P.75B. Chhamb	Whole	62.28	5.00(Part)
	Palampur	P.35P. Jhunga-Devi	3	21.45	6.00(Part)
	-do-	P.69P. Differpatt	Whole	24.79	4.79(Part)
	Daroh	P.23P. Kurang	4b	21.45	5.00(Part)
2014-15	Bajjnath	P.75B. Chhamb	Whole	62.28	5.00(Part)
	Palampur	P.69P. Differpatt	Whole	24.79	10.00(Part)
	Daroh	P.23P. Kurang	4b	21.45	8.45(Part)
2015-16	Bajjnath	P.75B. Chhamb	Whole	62.28	5.00(Part)
	Palampur	P.69P. Differpatt	Whole	24.79	10.00(Part)
	Daroh	P.39P. Bichhwai	1c	7.28	7.28
2016-17	Bajjnath	P.75B. Chhamb	Whole	62.28	5.00(Part)

	Palampur	P.59P. Delhi	Whole	26.62	6.00(Part)
	Daroh	P.46P. Maila	Whole	42.03	8.53
2017-18	Bajjnath	P.75B. Chhamb	Whole	62.28	5.00(Part)
	Palampur	P.59P. Delhi	Whole	26.62	10.00(Part)
	Daroh	P.49J. Harsi	Whole	38.64	5.00(Part)
2018-19	Bajjnath	P.76B. Tain	Whole	63.26	5.11(Part)
	Palampur	P.59P. Delhi	Whole	26.62	10.00(Part)
	Daroh	P.49J. Harsi	Whole	38.64	8.64(Part)
2019-20	Bajjnath	P.76B. Tain	Whole	63.26	5.00(Part)
	Palampur	P.60P. Kharti	Whole	56.78	10.00(Part)
	Daroh	P.51P. Devi	Whole	23.16	5.00(Part)
2020-21	Bajjnath	P.76B. Tain	Whole	63.26	5.00(Part)
	Palampur	P.60P. Kharti	Whole	56.78	10.00(Part)
	Daroh	P.51P. Devi	Whole	23.16	7.36(Part)
2021-22	Bajjnath	P.76B. Tain	Whole	63.26	5.00(Part)
	Palampur	P.60P. Kharti	Whole	56.78	10.00(Part)
	Daroh	P.53P. Chogan-I	Whole	18.77	5.00(Part)
2022-23	Bajjnath	P.76B. Tain	Whole	63.26	5.00(Part)
	Palampur	P.60P. Kharti	Whole	56.78	10.00(Part)
	Daroh	P.53P. Chogan-I	Whole	18.77	5.00(Part)
2023-24	Bajjnath	P.76B. Tain	Whole	63.26	5.00(Part)
	Palampur	P.60P. Kharti	Whole	56.78	10.78(Part)
	Daroh	P.53P. Chogan-I	Whole	18.77	5.77(Part)
2024-25	Bajjnath	P.76B. Tain	Whole	63.26	5.00(Part)
	Palampur	P.70P. Ghorat	Whole	21.27	10.00(Part)
	-do-	-do-	Whole	21.27	10.27(Part)

**TABLE: 2.4.9 PLANTATION-SERIES-II**

Year	Range	Name of forests	Comptt./ sub.Comptt.	Total area in ha.	Area to be planted in ha.
1	2	3	4	5	6
2010-11	Bajjnath	U.P.28B. Langu	Whole	10.12	10.12
	-do-	U.P.33B. Bhi-Khas	Whole	12.14	11.14
	-do-	U.P.40B. Duhk	3	16.19	12.94
	Palampur	U.P.2P. Dadh- Upperli	1	10.12	9.32
	-do-	U.P.3P. Diala	2	29.14	20.50
	-do-	-do-	4	10.12	10.12
	Daroh	U.P.43J. Jaisinghpur-II	2b	32.16	6.00
	-do-	-do-	3	53.22	16.19
	-do-	U.P.44J. Jaisinghpur-I	4	24.28	19.78
	-do-	U.P.51J. Dhaniara	3	72.91	32.62
2011-12	Bajjnath	U.P.38B. Chobin	2	16.19	16.19
	-do-	U.5B. Deol	7a	23.87	9.00



	-do-	U.45B. Beth-Upperli	1	7.28	7.28
	Palampur	U.P.76P. Jauna-IV	3	46.53	46.53
	-do-	U.P.77P. Jauna-III	Whole	61.91	25.00
	-do-	U.P.112 P. Naura	5c	24.28	9.38
	Daroh	U.P.43J. Jaisinghpur-II	9	72.03	37.03
	-do-	U.P.48J. Sakoh	1	13.35	13.35
	-do-	U.54J. Tamber	1	20.22	17.72
	-do-	U.P.49J. Alampur	12	41.37	8.00
2012-13	Bajjnath	U.P.39B. Bhlot	Whole	60.00	38.00
	Palampur	U.P.76P. Jauna-IV	5	7.69	7.69
	-do-	U.P.78P. Jauna-II	Whole	78.50	21.50
	-do-	U.P.113P. Dheera-II	4	107.73	25.00(Part)
	-do-	-do-	5	46.13	27.73
	Daroh	U.P.44J. Jaisinghpur-I	2	50.58	9.77
	-do-	U.P.45J. Karanghat & Kamand	Whole	27.52	9.88
	-do-	U.P.51 J. Dhaniara	5	12.55	9.55
	-do-	U.P.57P. Sedun	2	61.90	40.00
2013-14	Bajjnath	U.P.38P. Chobin	3	24.28	24.28
	-do-	U.4B. Lanod	7	12.55	10.55
	Palampur	U.P.79P. Jauna-I	2	42.48	12.00
	-do-	-do-	3	17.00	9.00
	-do-	-do-	4	16.19	12.98
	-do-	U.P.112P. Naura	5b	14.96	13.00
	-do-	U.P.113P. Dheera-II	4	107.73	25.00(Part)
	-do-	U.P.115P. Rajhoon-II	1	47.75	13.92(Part)
	Daroh	U.P.47J. Bhagun & Jhamun	1	20.64	8.00
	-do-	-do-	2	13.35	9.15
	-do-	U.P.49J. Alampur	3	59.88	5.50
	-do-	U.P.52J. Duhk	2	32.36	32.36
	-do-	U.P.55J. Dhodrian	Whole	22.26	13.10
	-do-	U.P.56J. Thural-II	1	11.33	11.33
2014-15	Bajjnath	UP.42B. Sansai-II	1b	45.31	27.31
	-do-	U.P.43B. Bhadrena	1	42.89	5.00
	Palampur	U.P.113P. Dheera-II	2	25.49	16.59
	-do-	U.P.114P. Dheera-III	3	83.35	26.95
	-do-	U.P.115P. Rajhoon-II	1	47.75	30.00(Part)
	-do-	U.P.120P. Bhangali	Whole	30.76	7.76
	Daroh	U.P.49J. Alampur	17	8.90	8.90
	-do-	U.P.52J. Duhk	1	16.19	16.19
	-do-	U.P.57P. Sedun	1	26.71	17.71
	-do-	U.P.59P. Thural - Khas	2	54.62	20.00(Part)
	-do-	U.P.60P. Thural-I	2	23.46	12.46
2015-16	Bajjnath	UP.42B. Sansai-II	2	107.08	36.55
	Palampur	U.P.113P. Dheera-II	4	107.73	23.73(Part)

	-do-	U.P.113P. Dheera-II	3	9.71	5.71
	-do-	U.P.118P. Jharet-Thakran	Whole	62.31	27.81
	-do-	U.12P. Bagh	6	46.13	26.13
	-do-	-do	3	13.35	7.15
	-do-	U.P. 64P. Heb	1	20.23	20.23
	-do-	U.P.65P. Baloh	5	20.23	18.23
	-do-	U.P.74P. Tamloh	2	21.04	21.04
2016-17	Bajnath	UP.42B. Sansai-II	3	53.41	10.00(Part)
	-do-	U.P.111P. Agojar-Khas	2	103.99	20.00(Part)
	Palampur	U.P.114P. Dheera-III	1	50.98	18.00
	-do-	U.P.115P. Rajhoon-II	2	105.60	30.00(Part)
	-do-	U.12P. Bagh	5	68.39	30.00(Part)
	Daroh	U.P.59P. Thural - Khas	1	12.14	12.14
	-do-	U.P.60P. Thural-I	3	19.42	9.42
	-do-	U.P. 64P. Heb	2	25.49	17.49
	-do-	U.P.89J. Garh-Jamula-II	1	49.36	30.00(Part)
	-do-	U.P.95P. Duhki	2	18.62	5.62
2017-18	Bajnath	UP.42B. Sansai-II	3	53.41	10.00(Part)
	-do-	U.P.111P. Agojar-Khas	2	103.99	20.00(Part)
	Palampur	U.P.115P. Rajhoon-II	2	105.60	30.00(Part)
	-do-	U.P.116P. Rajhoon-I	Whole	292.12	40.00(Part)
	-do-	U.P.121P. Brankar	3	48.55	8.55
	Daroh	U.P.59P. Thural - Khas	2	54.62	20.00(Part)
	-do-	U.P.60P. Thural-I	4	16.18	16.18
	-do-	U.P.89J. Garh-Jamula-II	1	49.36	15.20(Part)
	-do-	U.P.62P. Chillah	Whole	19.42	19.42
2018-19	Bajnath	UP.42B. Sansai-II	3	53.41	10.00(Part)
	-do-	U.P.111P. Agojar-Khas	2	103.99	20.00(Part)
	Palampur	U.P.114P. Dheera-III	2	31.97	16.19
	-do-	U.P.115P. Rajhoon-II	2	105.60	12.77(Part)
	-do-	U.P.116P. Rajhoon-I	Whole	292.12	40.00(Part)
	-do-	U.38P. Skeri	Whole	38.03	13.18
	Daroh	U.P.59P. Thural - Khas	2	54.62	14.62(Part)
	-do-	U.P.61P. Halun	Whole	10.12	9.12
	-do-	U.P.74P. Tamloh	1	16.19	16.19
	-do-	U.P.72P. Manjha-Buhla	2	20.64	16.00
	-do-	U.P.69P. Salan	Whole	19.02	9.00
	-do-	U.P.73P. Gadella	1	10.12	10.12
2019-20	Bajnath	UP.42B. Sansai-II	3	53.41	12.91(Part)

	-do-	U.P.111P. Agojar-Khas	2	103.99	21.27(Part)
	Palampur	U.P.115P. Rajhoon-II	3	181.66	25.00(Part)
	-do-	U.12P. Bagh	5	68.39	36.39(Part)
	-do-	U.P.117P. Rajhoon-III	1	23.47	23.47
	Daroh	U.P.65P. Baloh	1	20.22	10.22
	-do-	U.P.68P. Ghaget-Salan	1	13.76	6.00
	-do-	U.P.71P. Gadreter	3	9.71	7.71
	-do-	U.P.73. Gadella	2	13.35	13.35
	-do-	U.P.108P. Pat-Kwali	2	90.63	25.00(Part)
	-do-	U.P.103P. Behru	Whole	11.74	10.49
2020-21	Bajjnath	U.25B. Duhk-Nal	1	51.39	15.00(Part)
	-do-	U.46B. Beth-Buhli	3	52.60	20.00(Part)
	Palampur	U.P.115P. Rajhoon-II	3	181.66	25.00(Part)
	-do-	U.P.116P. Rajhoon-I	Whole	292.12	40.00(Part)
	-do-	U.P.115P. Rajhoon-II	4	55.03	5.91
	-do-	U.P.121P. Brankar	4	13.35	5.26
	-do-	U.13P. Birni	1	8.90	7.46
	Daroh	U.P.85P. Khajurnoo	2	16.59	6.59
	-do-	U.P.84P. Boharkhar	Whole	17.40	6.00
	-do-	U.P.86P. Marhun	Whole	13.35	6.85
	-do-	U.P.108P. Pat-Kwali	2	90.63	25.00(Part)
	-do-	U.P.98P. Sihol	Whole	28.33	23.00
	-do-	U.P.90P. Garh-Jamula-I	1	24.28	7.00
2021-22	Bajjnath	U.25B. Duhk-Nal	1	51.39	15.00(Part)
	-do-	U.46B. Beth-Buhli	3	52.60	20.00(Part)
	Palampur	U.P.115P. Rajhoon-II	3	181.66	25.00(Part)
	-do-	U.P.116P. Rajhoon-I	Whole	292.12	40.00(Part)
	-do-	U.41P. Dagher	Whole	16.19	15.69
	Daroh	U.P.88P. Linjhan	Whole	22.26	5.45
	-do-	U.P.89P. Garh-Jamula-II	2	39.66	17.66
	-do-	U.P.108P. Pat-Kwali	2	90.63	20.23(Part)
	-do-	U.P.102P. Badera	Whole	46.13	30.63
2022-23	Bajjnath	U.25B. Duhk-Nal	1	51.39	14.89(Part)
	-do-	U.25B. Ban-Deol	6b	41.27	20.00(Part)
	Palampur	U.P.115P. Rajhoon-II	3	181.66	25.00(Part)
	-do-	U.P.116P. Rajhoon-I	Whole	292.12	40.00(Part)
	-do-	U.P.117P. Rajhoon-III	2	49.77	20.00(Part)
	Daroh	U.P.90P. Garh-Jamula-I	2	25.09	7.09
	-do-	-do-	6a	12.14	12.14
	-do	U.P.89P. Garh-Jamula-II	4	47.74	12.74
	-do-	U.P.106P. Andaur	Whole	25.09	23.09

	-do-	U.P.99P. Bari	2	16.19	16.19
2023-24	Baijnath	U.25B. Ban-Deol	6b	41.27	21.27(Part)
	-do-	U.49P. Malghota	Whole	28.33	6.13
	-do-	U.P.116P. Rajhoon-I	Whole	292.12	23.20(Part)
	-do-	U.40P. Lunani	Whole	112.08	30.00(Part)
	-do-	U.39P. Gadella	2	13.76	10.00
	Daroh	U.P.97P. Ban-Bhatalu	2	25.90	15.00
	-do-	U.P.100P. Molag	3	39.25	20.00(Part)
	-do-	U.P.107P. Nadli	Whole	60.69	25.00(Part)
	-do-	U.P.108P. Pat-Kwali	1	6.07	6.07
	-do-	-do-	3	6.07	6.07
2024-25	Baijnath	U.25B. Ban-Deol	2	38.85	13.85
	-do-	U.45B. Beth-Upperli	4	18.61	10.61
	-do-	U.43B. Bhadrena	2	13.35	6.35
	Palampur	U.P.117P. Rajhoon-III	2	49.77	25.72(Part)
	-do-	U.40P. Lunani	Whole	112.08	62.58(Part)
	Daroh	U.P.99P. Bari	1	11.33	11.33
	-do-	-do-	3	24.28	24.28
	-do-	U.P.100P. Molag	2	21.04	17.04
	-do-	-do-	3	39.25	9.04(Part)
	-do-	U.P.107P. Nadli	Whole	60.69	20.69(Part)

**TABLE: 2.4.10 PLANTATION-SERIES-III**

Year	Range	Name of forests	Comptt./ sub.Comptt.	Total area in ha.	Area to be planted in ha.
1	2	3	4	5	6
2010-11	Palampur	C.F.S. Arla-Saloh	U.P.1	6.07	4.07
	-do-	-do-	U.P.14	15.78	6.00
	-do-	C.F.S. Bhagotla	U.5	14.57	5.00
	Daroh	C.F.S. Maniara	P.4c	9.30	4.00
	-do-	-do-	U.P.11	3.64	3.00
2011-12	Palampur	C.F.S. Gaggal	U.P.10	6.88	6.88
	-do-	-do-	P.14	18.21	7.00
	Daroh	C.F.S. Maniara	P.2	7.28	2.00
	-do-	-do-	U.P.12	9.71	4.46
2012-13	Palampur	C.F.S. Gaggal	U.P.11	9.31	9.31
	-do-	-do-	U.P.64	4.86	4.00
	Daroh	C.F.S. Maniara	U.P.19	4.45	2.00
	-do-	C.F.S. Balota	U.P.8	6.07	5.32
2013-14	Palampur	C.F.S. Gaggal	P.15	17.80	6.00
	-do-	-do-	P.33	8.09	3.07
	-do-	-do-	U.P.65	6.07	4.07
	Daroh	C.F.S. Maniara	Sep. Kh. No.	8.90	8.90
2014-15	Palampur	C.F.S. Gaggal	U.P.67	6.88	4.00

	-do-	-do-	P.68a	7.28	6.03
	-do-	-do-	U.P.81	8.50	4.50
	Daroh	C.F.S. Maniara	U.P.21	4.04	2.00
	-do-	C.F.S. Punner-Dehan	S-3	5.26	2.26
	-do-	-do-	S-4	6.88	2.28
	-do-	C.F.S. Dagera	U.P.16	2.02	2.02
2015-16	Palampur	C.F.S. Gaggal	Sep. Kh. No.	61.91	15.00(Part)
	Daroh	C.F.S. Balota	Sep. Kh. No.	8.09	8.09
2016-17	Palampur	C.F.S. Gaggal	P.68b	8.09	8.09
	-do-	-do-	U.P.80	10.52	6.32
	Daroh	C.F.S. Dagera	U.P.7	7.69	7.69
2017-18	Palampur	C.F.S. Gaggal	Sep. Kh. No.	61.91	15.00(Part)
	Daroh	C.F.S. Dagera	U.P.4	4.86	4.86
	-do-	-do-	Sep. Kh. No.	2.83	2.83
2018-19	Palampur	C.F.S. Gaggal	Sep. Kh. No.	61.91	15.00(Part)
	Daroh	C.F.S. Dagera	U.P.13	9.71	9.71
2019-20	Palampur	C.F.S. Gaggal	Sep. Kh. No.	61.91	16.91(Part)
	Daroh	C.F.S. Gharana	U.P.5	6.47	6.47
2020-21	Palampur	C.F.S. Khalet	U.P.4	2.83	2.83
	-do-	-do-	U.P.13	2.02	2.02
	-do-	-do-	U.P.14	5.26	5.26
	-do-	-do-	U.P.15	3.24	3.24
	Daroh	C.F.S. Gharana	U.P.4	14.16	11.41
2021-22	Palampur	C.F.S. Khalet	U.P.20	2.83	2.83
	-do-	-do-	Sep. Kh. No.	8.50	8.50
	-do-	C.F.S. Kushmaal	Sep. Kh. No.	5.26	5.26
	Daroh	C.F.S. Gharana	U.P.6	7.69	4.00
	-do-	C.F.S. Punner-Dehan	S-34	4.45	3.00
2022-23	Palampur	C.F.S. Maranda-Bhangiar	Sep. Kh. No.	11.33	11.33
	-do-	C.F.S. Panaper	U.P.10	8.50	2.50
	Daroh	C.F.S. Maniara	U.P.10	22.66	6.66
	-do-	C.F.S. Punner-Dehan	U.P.33	4.45	2.45
2023-24	Palampur	C.F.S. Panaper	U.P.23	4.45	2.00
	-do-	-do-	Sep. Kh. No.	8.90	8.90
	Daroh	C.F.S. Punner-Dehan	U.P.18	7.28	5.28
2024-25	Palampur	C.F.S. Paror	Sep. Kh. No.	17.40	8.00(Part)
	-do-	C.F.S. Paror	Sep. Kh. No.	17.40	9.40(Part)
	Daroh	C.F.S. Punner-Dehan	S-35	14.20	4.20

#### 2.4.15. SUBSIDIARY SILVICULTURAL OPERATIONS: -

**2.4.15.1. CLEARING OF THE FELLED AREA:** - All the tree and shrub growth other than the standards and the young growth required to be retained, shall be felled. After the main felling the villagers should be encouraged to remove the cut brushwood and other bushes. All unsaleable material unwanted bushes should be cut and collected along the periphery of the area to act as fence, or dumped in depressions or nallas.

**2.4.16. ARTIFICIAL REGENERATION:** - The programme for sowing and planting has been given in para 2.4.14 above.

**2.4.16.1. TREATMENT OF EXISTING PLANTATIONS:** - There are some existing young plantations in working circle. These need to be given due attention for their protection and maintenance. Beating up of failures, weeding and such cutting are done as required. No cleanings are presently required but may be done in due course of time if needed. The fence be repaired regularly and kept intact. Fire protection of these areas must be ensured.

**2.4.16.2. NEW PLANTATIONS:** - The technique of "Forestry Nursery works" and "Artificial Reproduction" in hills has been dealt with in the Technical Order no. 3 & 4 contained in the Punjab Forest Manual, Vol.-III. It is suggested that sufficient copies of these instructions incorporating the latest changes be supplied to the range officers for guidance of the field staff. The general principles to be followed for planting are detailed below:

**Notification of closures:** - Every area to be taken up for plantation should be notified for closure one year in advance. The period of closure may be 10-15 years.

**Treatment Map:** - Treatment map on 1:3,750 scale shall be prepared for each plantation area showing the plantable / unplantable locations, soil type, soil depth, drainage, slope and the species to be planted. This map shall be maintained in the compartment history file and one copy should be attached in the Plantation Journal.

**Clearance of site:** - The site will be cleared of bushes and other unwanted growth only to the extent absolutely necessary. However, on warmer aspects, staggered bushes of *Dodonaea*, *Flacourtia*, *Pyrus* etc. should be retained to afford shade.

**Fencing and Earth work:** - After the site is cleared, the fencing and pit digging operations shall be done simultaneously. All plantation areas will be effectively fenced with stones wall or four strands barbed wire depending upon the availability of stones and fence posts. Pits of standard sizes should be dug for conifers and broad-leaved species. Advance work of fencing and pit digging is prescribed. This helps in weathering and improvement of the soil.

<b>Table: 2.4.11. Variables regarding seed collection, seed weight and time of sowing.</b>							
<b>Sr. No.</b>	<b>Species</b>	<b>Seed collection</b>	<b>Seed weight in kg.</b>	<b>Pretreatment</b>	<b>Sowing in nursery beds</b>	<b>Germi-nation percent</b>	<b>Period of germination in days</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
1	Kachnar	May-June	2,800-3,500	6-8 hours in water	May-June	85-90	15-20
2	Robinia	Sept.-Oct.	40,000	24 hours in water	Feb.-March	65-70	15-20
3	Khirk	Oct.-Nov.	4,000-5,000	24 hours in water	Feb.-March	50-60	28-30
4	Dhaman	Oct.-Dec.	95,000	12 hours in water	March	50-60	30-35
5	Ohi	Nov.-Dec.	45,000 to 50,000	12 hours in water	Feb.-March	70-75	28-30
6	Ritha	Oct.-Nov.	500-600	10-15 days in cow-dung	Feb.-March	50-60	30-45
7	Siris	Oct.-Nov.	8,000	24 hours in water	Feb.-March	60-70	30-45
8	Drek	Feb.-Dec.	2,000 fruits	10 days in cow-dung	Feb.-May	65-70	35-40
9	Ban-oak	Nov.-Dec.	400-600	24 hours in water	Feb.-March	50-60	30-45

**2.4.16.3. THE NURSERY AND PLANTING TECHNIQUES:** - The site for nurseries should be selected nearer to the plantation areas and the source of water. The plant requirement should be worked and entire operations be planed in advance. The nursery should be raised well before the actual planting, depending upon the time required to get seedlings of plantable size. Some variables regarding seed collection, seed weight and time of sowing for ready reference are given in Table: 2.4.11 as under: -

The broad principles of raising some important species are briefly discussed as under:

**(i) Deodar:** - The seed is collected during October/November. Sowing in nursery beds is done in lines in 10 cm. apart before the first snowfall in November/December. Soaking in cold water for 2-4 hours should be done to pre-treat the seed. After sowing, the beds should cover with humus. About 8,000 seed weighs one kg. Germination percentage is 50-60 %. Good seed year occurs every third year. Germination takes place after melting of snow in March or early April, depending upon the location of the nursery. Beds are watered in May/June. Pricking out of seedlings in beds is done during July at spacing of 7.5 cm. x 7.5 cm. Weeding, hoeing and watering etc. is to be done as per requirement. In next July, when seedlings are one and half year old about 15-20 cm. high, these are fit for planting up in the field.

The site of planting must be prepared well in advance. All bushes and shrubs should be cut and cleared. Pit of the size 30cm. x 30cm. at a spacing of 2.5m. x 2.5m. should be dug in March/April so as to allow sufficient time for weathering of soil and to complete the planting work at the earliest after the rain set in. Planting should be done immediately after the first week of August at the latest. The late planting are generally unsuccessful. Cloudy and rainy days should be preferred for planting as far as possible.

Utmost care should be exercised in taking out the plants from nursery beds and this work should never be left to the labour. In case the plants are carried over long distances these should be wrapped in the moist gunny bags. During these operations, it is absolutely necessary to ensure that the root system does not get damaged. Grading of stock is very essential and all unhealthy seedlings should be discarded. In planting, special care is required to avoid the curling of the tip of the root of seedlings.

**(ii) Kail:** - Direct sowing generally raises Kail. The seed is collected during September/October. About 15,000 seeds weighs a kg. Germination percentage is 70-95 %. Though a certain amount of seed is produced every year, but alternate year is a good seed year. Sowing in patches of 60cm. x 45cm. at spacing of 3m should be done just before the break of rains, i.e. end of June/First week of July. However, sowing in November before snowfall is also being recommended. About 15-20 seeds should be sown per patch. After sowing, the patches are covered by dry grass preferably thorny material. The germination is generally profuse and is completed in 15 days if rains are favorable. After germination the mulch should be removed. Kail being the pioneer species colonized the freshly exposed sites. It is strong light demander, and like chil requires no overhead shade. Tending of young regeneration is very important and should receive complete attention. Kail is among the conifers, most susceptible to fire damage. All new regeneration areas should, therefore be strictly protected against fire.



**(iii) Fir/Spruce:** - Nurseries of Fir/Spruce should be located in the natural levels and not at lower levels as was the past practice. The seed is collected in late September/October. About 60,000 seeds weight a kg. It is estimated that for a plantation of 1 ha at a spacing of 2.5m. x 2.5m. nursery of 150sq.m. (15 sq.m. for germination and 135sq.m. for transplant beds) is required.

Damping off takes place a heavy toll of spruce seedlings in the nurseries, which is most severe in excessively wet nursery soils. To avoid this, sowing should be done during spring and not during June. Soil fumigation with formalin, given about 15 days before sowing, helps in controlling damping off. A solution of 250 ml. of formalin in about 4 liters of water per square meter of the bed area is applied. After application, the beds should be immediately covered with polythene sheet that is removed after three days and the soil is raked to allow the fumes to escape. After the germination, the beds should be drenched with 0.25 % Blitox solution every fortnight for three months. Spring sowing coupled with soil fumigation has proved very effective in controlling damping off.

Sowing during spring is done in raised beds of 1-meter width. The seed is soaked in water for 24 hours before sowing. Sowing in 4cm. wide strips, 10 cm. apart gives better germination and growth than sowing in lines. Depth of sowing is normally 1 cm. and 40 gm. of seed with 80 % of germination is required per sq. meter of nursery area. Germination starts in about 15 days and is complete in 30 days. The weeding and watering of beds is done as required.

Transplanting of seedlings is done during next July / August when the seedlings are about 16 months old. Transplanting is done at a spacing of 15 cm. x 8 cm. Pruning of roots leaving about 10 cm. root length is found helpful. The height of seedlings at the time of transplanting should not be less than 10 cm. Shading of transplant beds is essential during the first year. The beds should be properly weeded. The plants are ready for planting out in the field after two years of transplanting when these are 3.5 years old and about 30 cm. in height.

The planting out in the field is done on the onset of monsoon. The thorough clearing of plantation site is not necessary, since fir not only tolerates some lateral shade, but such shade is desirable also to protect the young plants in the initial stages. However, bushes should be cut and slash burnt, especially in damp areas where there is thick layer of humus. Pits of 45 cm. x 45 cm. size should be dug at a spacing of 2.5 m. x 2.5 m. during April / May. Direct sowing of fir, spruce should not be attempted in view of the fact that these areas are generally characterized by deep accumulation of humus and thick herbaceous growth during rains, which inhibits germination.

**(iv) Kachnar (*Bauhinia variegata*):**- The pods ripen in May / June when these are collected. The seeds separate when pods open up on drying in the sun. About 2800 – 3500 seeds weighs a kg. The seed is viable for about one year if stored in airtight container. The seed is soaked for 6 – 8 hours in Bevestin solution (1%).

Soil of nursery beds is worked up to a depth of 30 cm. and farm yard manure @ 4-5 kg. per sq. meter and super-phosphate and N.P.K. mixture @ 30 gm./ sq. meter are added and thoroughly mixed with the soil. Brassicol 2-3 gm. / sq. meter is also added to check damping effect. Raised beds, 1 meter wide, are prepared. The seed is sown during June, 1 cm. deep, in drills 30 cm. apart at a distance of 5 cm. from seed to seed. The beds are then mulched with dry grass keeping the line of sowing just open. Hand watering with rose cans is done in morning and evening till the germination is complete: once a day for a week after germination, and thereafter on the alternate days. The germination is about 85-90 % and is complete in 15-20 days. Mulch is removed after germination. After a fortnight of germination, weeding and hoeing is done twice a month in July, August and September and once a month thereafter up to mid February. Chemical fertilizer, N.P.K. is added @ 30 gm. per sq. meter during the rains.

During February and early March when the seedlings are about 7 months old, these are transplanted by making stumps to the transplant beds: prepared and manured as the nursery beds. Stumps are prepared by pruning the root and shoot of the seedlings keeping the root, 15-20 cm. and the shoot, 5 cm. The stumps are prepared under shade, covered with soil and wet gunny bags to avoid drying. The root portion is dipped in Bevistin solution (1%) for 3-5 minutes before transplanting to prevent any fungal attack. The stumps are planted at spacing of 25 cm. in lines 30 cm. apart. Mulching is done in between the lines. The beds are watered and weeded as and when required. The stumps throw out new shoots during April / May. Singling out of shoots is done in May / June, but never during rainy season, otherwise fungal diseases may attack the plants. Chemical fertilizers CAN @ 10 gm. per sq. meter, is added before and after the monsoon.

Winter planting is done in February by preparing stumps (root 25 cm. and shoot 45 cm.) from healthy plants. Before transplanting to the planting sites, the roots of the stumps are dipped in Bevistin solution (1%) for 3-5 minutes and properly wrapped. The planting is done in pits at a spacing of 2.5 x 2.5 m. Monsoon planting of two years old, entire plant is planted with onset of rains. The plants are de-leaved and the roots are trimmed. The time between uprooting, packing, transporting and planting should not be more than 2-3 days. Leaves of the plants are some times attacked by defoliators, to prevent this *Metasystox* is sprayed during the pre-monsoon period / the first monsoon.

**(v) Walnut, Ash, Maple and other Broad-leaved species:** - seed raises Most of the broad-leaved species, the technique is same as for Kachnar, given above with minor variations. Two years old nursery raised entire plants will be planted at a spacing of 2.5 cm x 2.5 cm. These species are intended to be raised in damp localities at high altitudes. Aggressive broad-leaved weeds usually colonize these glades. It shall, therefore, be necessary to clear the bushes and burn the slash before planting work is taken in hand. Subsequent tending will be undertaken as long as the plants don't overtop the competing weeds. The variable particulars

regarding time of seed collection, seed weight, time of sowing etc. for a few important species suitable to the locality are given below in Table: 2.4.3.

**2.4.16.3.1. SPECIES RAISED BY CUTTINGS:** - The details of operations regarding preparation of beds, application of chemicals and fertilizers, watering, weeding and hoeing etc. remain generally the same as described above. The other details are given as under:

The cuttings, 25-30 cm. long and 2.5 cm. thick are prepared in January-February from vigorous shoots either from the trees or from plants already raised in nursery. The cuttings are planted in the nursery beds at a distance of 22.5 cm. in lines 30 cm. apart. After sprouting in March, singling of shoots is done and only one straight shoot is allowed to grow. The beds are watered, weeded and manured as per the practice prescribed above.

Planting in the field, of entire plants, which have attained a height of 2-2.5 meter is done during next January-February. The roots of plants are pruned and kept 25-30 cm. long; the shoot portion is not disturbed but only de-leafed. The smaller plants are planted again in the nursery beds. In case of Willow, the terminal bud dies at the end of growing season, therefore the side bud just below the terminal bud, is made as terminal bud by cutting out the shoot above it along-with the dead terminal bud. The root portion is dipped in Bevistin solution (1%) before packing / wrapping in wet gunny bags for transportation to the planting site. Planting in the pits (45 cm. x 45 cm. x 45 cm.) is done at a spacing of 2.5 m x 2.5 m.

It has been observed that two years old plants give the best results. Therefore, sometimes the shoot of one-year-old plants is cut into cuttings, which are raised in the nursery beds as described above. This gives straight, stout and healthy two years old plants for field planting.

**2.4.16.3.2. MAINTENANCE AND AFTER-CARE OF PLANTATION AREAS:-** The after-care and maintenance operations is of utmost importance, as most of the species to be raised are very palatable and may become the first target of cattle. Beating up of failures is to be carried out up to 3-4 years. Repeated bush cutting may have to be done in these areas up to 5-6 years. Repair to fencing should not be neglected as the areas are frequented by a large number of cattle. There is no necessity of cleanings and thinning in most of the existing young plantations at present. Pruning of chil plantations may be done as per existing instructions.

**2.4.17. LAND BANK:** - To carryout plantations under Compensatory Afforestation scheme, land bank in UP 45 B Bheth Upperli, 20.00 ha, and UP 49 J Alampur (Compartment-9,10 and 12) 20.00 ha are identified for this purpose.



Land Bank in UP 45 B Bheth Upperli

**2.4.18. OTHER REGULATIONS:** - The other regulations for plantations areas will be as under:

**2.4.18.1. Closures:** - All plantation areas shall remain closed for 10-15 years depending upon the progress of regeneration. All the closures should be affected for the minimum possible period actually required by the plantation so that least hardship is caused to the right holders. Grass cutting should not be allowed in plantation areas till the young plants are beyond damage and may be allowed under strict supervision of the concerned Beat Guard.

Not much of difficulty is anticipated with regard to closures in Delimited Protected Forests. However, closures in parts, of such areas may not be for more than 10 years, as prescribed by Mitchell and Walter's scheme. All sincere efforts should be made to regenerate the closed areas during this period. As to the closures in U.P.F.'s, U.F.'s and C.F.S. these can only be obtained through persuasion, motivation and J.F.M. techniques. In future, large compact blank areas may not be available for closures. Areas in small bits, in extent of even up to 5.00 ha. will have to be taken up for planting.

**2.4.18.2. Lopping:** - No lopping will be permitted in closed areas. In other areas lopping rules be strictly enforced particularly for Ban-oak near the habitations.

**2.4.18.3. Marking of right-holders:** - A great care needs to be exercised while carrying out marking to right-holders so as not to create permanent gaps in the canopy and that the selected trees are removed.

**2.4.18.4. Plantation paths:** - Every plantation area should be well served with a carefully aligned inspection path for easy and effective plantation activity and for subsequent inspection of the area. The path should be kept properly repaired and maintained.

**2.4.18.5. Fire protection:** - All old and new plantation areas must be protected against fire. To this end, firewatchers during the fire season may be engaged where-ever considered necessary.

**2.4.18.6. Plantation record:** - Plantation journal should be maintained for each plantation area on the prescribed form. The details of all operations carried out in the plantation areas along-with their cost must be recorded in the plantation journals. Any abnormal failures must be analysed and the reasons thereof recorded in the plantation journal. The abstract of these should also be recorded in the respective forms appended in the compartment history files.

**2.4.18.7. Regeneration survey:** - Regeneration survey on 1:3,750 scale shall be carried out every year till the plantation is established. The reasons of failure, if any should invariably be recorded in the survey report and pasted in the respective compartment history files.

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## CHAPTER-V

### THE PROTECTION-CUM-REHABILITATION WORKING CIRCLE

#### **2.5.1. GENERAL CONSTITUTION AND CHARACTER OF VEGETATION: -**

This circle includes all classes of forests of Fir/Spruce, Kail, Deodar and high level blanks mostly unculturable. The areas allotted to this working circle are tough terrain, inaccessible, prone to erosion, slips and landslides, situated on precipitous slopes, which require complete protection against denudation and soil erosion. Commercial working in these forests is not prescribed as the forests are either inaccessible, remote or their preservation is desirable from the ecological consideration. For the part they are of high lying type and contain large areas of Kharsu oak, scattered Fir or Birch. Their chief value lies in being most important from the point of view of protection in preventing denudation conserving the environment and moisture regime, balancing the ecosystem and maintaining the regular supply of water in the streams and rivers which have their sources in these hills. The environmental value of these forests is more in addition to their protective value though they would not be worked commercially but protected and maintained as such. Total area of this working circle is 21,838.79 ha. 50 % of this lies in Baijnath Range. The character of vegetation has been described in **Chapter-II (Part-I)**.

**2.5.2. BLOCKS AND COMPARTMENT: -** The compartments/sub-compartments generally remains unchanged except a few. The list of new compartments / sub-compartments have been given in **para 2.1.16 chapter-I(Part-II)**

**2.5.3. SPECIAL OBJECTS OF MANAGEMENT: -** Protection and preservation are the essentials of management of forests in this working circle. Consistent with the general objects of management, these are:

- (i) To protect hill-sides denudation and erosion by preserving and enhancing the forest cover.
- (ii) To improve the growing stock in quality and density through sowing and planting.
- (iii) To protect the forests from indiscriminate exploitation and to preserve them as representative ecosystem of the region.
- (iv) To conserve the environment and stabilize the ecosystem.
- (v) Consistent with the above, to meet the demand of fuel, fodder, grass, timber and other forest produce to local inhabitants.

**2.5.4. AREA AND ALLOTMENT: -** The details of forests allotted to this working circle are given in Appendix-I. The abstract showing the area distribution by ranges and legal categories are given in Table: 2.5.1.

**Table: 2.5.1. Area statement and Legal Classification**

<b>Class of forest</b>	<b>Area (ha.) in different ranges</b>			<b>Total</b>
	<b>Bajnath</b>	<b>Daroh</b>	<b>Palampur</b>	
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
D.P.F.	1,354.52	380.78	4,686.84	6,422.14
U.P.F.	172.55	259.15	48.97	480.67
U.F.	9,925.37	-	4,807.49	14,732.86
C.F.S	-	180.06	23.06	203.12
<b>Total</b>	<b>11,452.44</b>	<b>819.99</b>	<b>9,566.36</b>	<b>21,838.79</b>

From the above table, it is evident that more than 65% area of this circle is in the un-demarcated and un-classed forests, where effective closures are a big problem. This is a major constraint in the management of these forests.

#### **2.5.5. ANALYSIS AND VALUATION OF THE CROP: -**

**2.5.5.1. STOCK-MAPS: -** The entire area has been stock-mapped on 1:15,000 scales for all compartments/sub compartments allotted to this working circle and maps pasted in the respective Compartment History files. The detailed stocking of forests category wise is given in Table 2.5.2 as under:

**Table: 2.5.2. Area in ha. under various species.**

<b>Range.</b>	<b>Class of Forests</b>	<b>Chil.</b>	<b>Ban-oak.</b>	<b>Kharsu Oak</b>	<b>Misc. B.L.</b>	<b>Fir/Spruce</b>	<b>Culturable blank.</b>	<b>Un Culturable blank</b>	<b>Total.</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>12</b>
Bajnath	D.P.F.	22.00	773.91	235.88	29.24	199.50	42.90	51.09	1,354.52
	U.P.F.	16.00	94.58	-	2.62	-	59.35	-	172.55
	U.F.	146.79	1,768.20	2,620.49	184.90	2,052.47	555.39	2,597.13	9,925.37
<b>Total</b>		<b>184.79</b>	<b>2636.69</b>	<b>2856.37</b>	<b>216.76</b>	<b>2251.97</b>	<b>657.64</b>	<b>2648.22</b>	<b>11,452.44</b>
Palampur	D.P.F.	3.66	328.11	-	936.90	218.49	680.16	2519.57	4,686.84
	U.P.F.	27.72	-	-	5.21	-	1.88	14.16	48.97
	U.F.	10.73	11.78	-	377.91	215.35	5.00	4,186.72	4,807.49
	C.F.S.	3.21	-	-	13.17	-	6.68	-	23.06
<b>Total</b>		<b>45.32</b>	<b>339.89</b>	<b>-</b>	<b>1,333.19</b>	<b>433.84</b>	<b>693.72</b>	<b>6,720.45</b>	<b>9,566.36</b>
Daroh	D.P.F.	37.93	-	-	337.85	-	-	5.00	380.78
	U.P.F.	29.33	-	-	227.01	-	2.81	-	259.15
	C.F.S.	9.94	170.12	-	-	-	-	-	180.06
<b>Total</b>		<b>77.20</b>	<b>170.12</b>	<b>-</b>	<b>564.86</b>	<b>-</b>	<b>2.81</b>	<b>5.00</b>	<b>819.99</b>
<b>G. Total</b>		<b>307.31</b>	<b>3,146.70</b>	<b>2,856.37</b>	<b>2,114.81</b>	<b>2,685.81</b>	<b>1,354.16</b>	<b>9,373.67</b>	<b>21,838.79</b>

**2.5.5.2. SITE-QUALITY AND AGE CLASSES:** - The average site quality of Deodar and Kail is II/III and II respectively. All age classes are found mixed together with preponderance of middle aged to mature trees.

**2.5.5.3. DENSITY:** - The canopy density has been assessed occularly and recorded in the respective Compartment History files. There is vast variation in density from forest to forest; it varies in some forests blank to open moderately stocked and comparatively better in case of De-limited Protected Forests. The average density of all forests may be taken as 0.3 to 0.4.

**2.5.5.4. ENUMERATIONS:** - Sinceno regular fellings are to be done in this working circle, therefore to assess the growing stock randomized 5% partial enumerations with compartment/sub-compartment as unit have been carried out. Trees down to 10 cm. d.b.h. in 10 cm. diameter classes were enumerated and position of growing stock in this working circle is as under in Table: 2.5.2.

**Table: 2.5.3. Position of Growing Stock**

<b>Species</b>	<b>Average G.S./ha. in cum.</b>	<b>Total area in ha.</b>	<b>Total G.S. in cum.</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Conifers.	94.38	21,838.79	20,61,246.40
Broad leaved.	154.42	21,838.79	33,72,364.00

**2.5.6. SILVICULTURAL SYSTEM:** - No definite silviculture system is prescribed. Only removal of dead dying and diseased trees is prescribed. These forests are just to be preserved and protected. No commercial exploitation is contemplated and as such no silvicultural system is prescribed. Fellings of trees only to meet the requirement of right-holders are allowed. The culturable blanks and poorly stocked area i.e. up to 0.3 densities will be taken up for planting with suitable species.

**2.5.7. ROTATION AND EXPLOITABLE DIAMETER:** - Rotation is of little or of no significance for this Working Circle.

**2.5.8. REGENERATION PERIOD:** - Regeneration period is of little or no significance for this Working Circle.

**2.5.9. CALCULATION OF YIELD:** - It is of no relevance in Protection Working Circle. Only dead, dying, diseased and uprooted trees are to be removed. However, record of all such removals will be maintained in the prescribed control forms.

**2.5.10. THE PRESCRIBED YIELD:** - In this working circle no yield is prescribed. Only dead, dying, diseased and uprooted trees are to be removed. However, record of all such removals will be maintained in the prescribed control forms.



**2.5.11. METHODS OF EXECUTING FELLINGS:** - Marking of trees to the right-holders is to be done in respect of dry and diseased trees only. The green trees should not be marked. Attempt should be made preferably to mark dry and fallen trees first. The tendency to remove the best-selected stems in such markings should be discouraged.

**2.5.12. TREATMENT OF AREAS:** - Culturable blanks of considerable size (3.00 ha.) shall be closed and planted up with suitable conifer and broad-leaved species. Lopping in such forests shall be regulated as per lopping rules strictly. The degraded forests with densities up to 0.3 shall be protected against denudation and soil erosion by effective closures and planting of suitable species. All possible soil conservation measures are to be adopted under relevant and prevalent schemes in these areas. Most of such forests are incapable of providing any more grazing and require complete closure. If the closure in totality is not possible, at least part of the compartment having good soil and fit for planting should invariably be closed and planted with suitable species. The soil conservation measures will consist of contour trenching, gully plugging, check damming and other suitable moisture retention activities etc. An area of 1,354.16 ha. of culturable blanks are to be planted up during the plan period of 15 years and the total of 1,403.76 ha. degraded forests shall be closed effectively to aid natural regeneration.

**2.5.13. CLOSURE AND PLANTING PROGRAMME:** - The total blank area to be closed is 1,354.16 ha. whereas the poorly stocked forest area is 1,403.76 ha. Thus on an average this gives an annual closure and planting of 90.27 ha. and 93.58 ha. respectively. The sequence of such closures of blanks and degraded areas of each range and category of forest-wise is given as under in Table: 2.5.4 and Table: 2.5.5 respectively.

**Table 2.5.4. Sequence of Closures of Blank Areas**

Year	Range	Name of forests	Comptt/ sub.Comptt	Total area in ha.	Area to be planted in ha.
1	2	3	4	5	6
2010-11	Bajnath	P.11B. Sansal	1c	239.94	9.31
	Palampur	P.14P. Kandbari	1	1,367.96	40.00(Part)
	Bajnath	U.P.125B. Sansal	3	117.35	39.35
2011-12	Bajnath	P.11B. Sansal	4	447.08	16.59
	Palampur	P.14P. Kandbari	1	1,367.96	30.00(Part)
	Bajnath	U.4B. Lanod	5	42.48	30.00
	-do-	U.5B. Deol	2	25.90	12.82
2012-13	Palampur	P.14P. Kandbari	1	1,367.96	48.00(Part)
	Bajnath	U.P.125B. Sansal	2d	35.32	16.00

	-do-	-do-	2e	16.26	4.00
	-do-	U.26B. Tar	Whole	388.42	20.00
2013-14	Palampur	P.14P. Kandbari	1	1,367.96	40.00(Part)
	Bajnath	U.19B. Banu-Khad	Whole	141.62	46.13
2014-15	Palampur	P.14P. Kandbari	1	1,367.96	50.00(Part)
	Bajnath	U.5B. Deol	7b	16.19	10.00
	-do-	U.20B. Duhk-Nal	2	392.87	28.00(Part)
2015-16	Palampur	P.14P. Kandbari	1	1,367.96	20.00(Part)
	-do-	-do-	4d	129.47	28.32
	Bajnath	U.20B. Duhk-Nal	2	392.87	40.00(Part)
2016-17	Palampur	P.14P. Kandbari	1	1,367.96	70.00(Part)
	Bajnath	U.20B. Duhk-Nal	2	392.87	19.81(Part)
2017-18	Palampur	P.14P. Kandbari	1	1,367.96	40.00(Part)
	Bajnath	U.24B. Siber-Nal	1	337.84	42.94(Part)
	-do-	-do-	2	266.64	6.48
2018-19	Palampur	P.14P. Kandbari	1	1,367.96	40.00(Part)
	Bajnath	U.24B. Siber-Nal	1	337.84	40.00(Part)
	-do-	U.23B. Kharas-Karot	4	63.52	4.00
	-do-	U.24B. Siber-Nal	3	376.28	4.08
2019-20	Palampur	P.14P. Kandbari	1	1,367.96	48.00(Part)
	Bajnath	U.25B. Ban-Deol	7	258.95	40.00(Part)
2020-21	Palampur	P.14P. Kandbari	1	1,367.96	50.00(Part)
	Bajnath	U.24B. Siber-Nal	4	286.06	14.98
	-do-	U.25B. Ban-Deol	3	110.06	23.09
2021-22	Palampur	P.14P. Kandbari	1	1,367.96	48.00(Part)
	Bajnath	U.25B. Ban-Deol	7	258.95	40.00(Part)
2022-23	Palampur	P.14P. Kandbari	1	1,367.96	48.00(Part)
	Bajnath	U.25B. Ban-Deol	7	258.95	10.00(Part)
	-do-	-do-	1	40.46	31.96
2023-24	Palampur	P.14P. Kandbari	1	1,367.96	39.00(Part)
	Bajnath	U.25B. Ban-Deol	7	258.95	9.00(Part)
	-do-	U.30B. Brah Nal	Whole	388.42	39.25
2024-25	Bajnath	P.11B. Sansal	2	53.41	17.00
	Palampur	P.14P. Kandbari	1	1,367.96	29.84(Part)
	Bajnath	U.25B. Ban-Deol	6b	40.46	37.63

**Table 2.5.5. Sequence of closures of Poorly Stocked Areas**

Year	Range	Name of forests	Comptt/ sub.Comptt	Total area in ha.	Area to be planted in ha.
1	2	3	4	5	6
2010-11	Palampur	P.14P. Kandbari	1	1,367.96	25.80(Part)
	Daroh	P.37P. Karahu	1b	5.67	5.67
	Baijnath	U.P.125B. Sansal	3	117.35	50.00(Part)
	-do-	U.4B. Lanod	5	42.48	12.48
2011-12	Palampur	P.14P. Kandbari	1	1,367.96	24.00(Part)
	Daroh	P.37P. Karahu	1c	6.88	6.88
	Baijnath	U.P.125B. Sansal	3	117.35	28.90(Part)
	-do-	U.20B. Duhk-Nal	2	392.87	55.00(Part)
2012-13	Palampur	P.14P. Kandbari	1	1,367.96	22.00(Part)
	-do-	P.28P. Jaman-Nal	1	12.95	8.09
	-do-	U.9P. Ukhli-Muhli	1	116.53	40.00(Part)
	Baijnath	U.20B. Duhk-Nal	2	392.87	23.00(Part)
2013-14	Palampur	P.14P. Kandbari	1	1,367.96	20.00(Part)
	-do-	P.14P. Kandbari	4d	129.47	10.00(Part)
	-do-	U.9P. Ukhli-Muhli	1	116.53	20.92(Part)
	-do-	U.9P. Ukhli-Muhli	2	183.69	22.31(Part)
	Baijnath	U.20B. Duhk-Nal	2	392.87	20.00(Part)
2014-15	Palampur	P.14P. Kandbari	1	1,367.96	20.00(Part)
	-do-	P.14P. Kandbari	4d	129.47	10.00(Part)
	-do-	U.10P. Bind	Whole	776.83	50.00(Part)
	Baijnath	U.20B. Duhk-Nal	2	392.87	14.00(Part)
2015-16	Palampur	P.14P. Kandbari	1	1,367.96	20.00(Part)
	-do-	P.14P. Kandbari	4d	129.47	10.00(Part)
	-do-	U.10P. Bind	Whole	776.83	50.00(Part)
	Baijnath	U.23B.Kharas-Karot	4	63.52	15.52(Part)
2016-17	Palampur	P.14P. Kandbari	1	1,367.96	20.00(Part)
	-do-	P.14P. Kandbari	4d	129.47	10.00(Part)
	-do-	U.10P. Bind	Whole	776.83	50.00(Part)
	Baijnath	U.23B. Kharas-Karot	4	63.52	13.00(Part)
2017-18	Palampur	P.14P. Kandbari	1	1,367.96	20.00(Part)
	-do-	P.14P. Kandbari	4d	129.47	10.00(Part)
	-do-	U.10P. Bind	Whole	776.83	47.05(Part)
	Baijnath	U.26B. Tar	Whole	174.38	16.06(Part)
2018-19	Palampur	P.14P. Kandbari	1	1,367.96	20.00(Part)
	-do-	P.14P. Kandbari	4d	129.47	10.00(Part)
	-do-	U.9P. Ukhli-Muhli	2	183.69	40.00(Part)
	-do-	U.34P. Kalaban	2	1549.22	10.00(Part)
	Baijnath	U.26B. Tar	Whole	174.38	15.00(Part)
2019-20	Palampur	P.14P. Kandbari	1	1,367.96	20.00(Part)
	-do-	P.14P. Kandbari	4d	129.47	10.00(Part)
	-do-	U.34P. Kalaban	2	1549.22	32.59(Part)
	Baijnath	U.23B. Kharas-Karot	4	63.52	31.00(Part)
2020-21	Palampur	P.14P. Kandbari	1	1,367.96	25.00(Part)
	-do-	P.14P. Kandbari	4d	129.47	10.00(Part)

	-do-	U.34P. Kalaban	2	1549.22	40.00(Part)
	Bajjnath	U.26B. Tar	Whole	174.38	20.00(Part)
2021-22	Palampur	P.14P. Kandbari	1	1,367.96	25.00(Part)
	-do-	P.14P. Kandbari	4d	129.47	5.00(Part)
	-do-	U.34P. Kalaban	2	1549.22	50.00(Part)
	Bajjnath	U.26B. Tar	Whole	174.38	12.00(Part)
2022-23	Palampur	P.14P. Kandbari	1	1,367.96	22.00(Part)
	-do-	P.28P. Jaman-Nal	2	12.95	12.95
	-do-	U.34P. Kalaban	2	1549.22	50.00(Part)
	Bajjnath	U.26B. Tar	Whole	174.38	10.00(Part)
2023-24	Palampur	U.34P. Kalaban	3	235.48	23.06
	-do-	U.36P. Sethu-Nal	5	78.50	37.23(Part)
	-do-	U.36P. Sethu-Nal	5	78.50	37.23(Part)
	Bajjnath	U.20B. Duhk-Nal	2	392.87	23.03(Part)
2024-25	Palampur	P.14P. Kandbari	4d	129.47	6.16(Part)
	-do-	P.28P. Jaman-Nal	3	12.95	12.95
	-do-	U.34P. Kalaban	2	1549.22	10.00(Part)
		U.9P. Ukhli-Muhli	1	116.53	20.00(Part)

**2.5.14. SUBSIDIARY SILVICULTURAL OPERATIONS:** - The subsidiary silvicultural operations to be carried out are prescribed as under:

**2.5.14.1. Notification of Closures:** - The area to be taken up for plantation should be notified for closure under section 33 of IFA, one year in advance. The tenure of closure may be 10-15 years depending upon choice and growth of species.

**2.5.14.2. Clearance of sites:** - The area to be taken up for regeneration will be cleared off the bush growth if any. These will be burnt in depressions and blanks or dumped in nallah. Site clearance should be completed by the end of March positively.

**2.5.14.3. Treatment Map:** - For the areas taken up in a particular year, treatment maps on 1:3,750 scale shall be prepared showing soil type, depth, drainage, slope, planted area and species raised and pasted in Compartment History files.

**2.5.14.4. Site preparation and earth works:** - Sowing of seeds will be done in 1M<sup>2</sup> patches laid along the contours at a distance of 3 mts. The planting of economically superior species should be done at a spacing of 3x3 mts in pits of 30x30cm or 45x45cm size, depending upon the requirement of species. The area should be closed simultaneously with barbed wire fencing. The earth work and fencing should be completed by the end of May every year.

**2.5.14.5. Nurseries:** - One permanent nursery which is centrally located should be managed in each range so as to facilitate the availability of good and

healthy planting stock. Temporary nurseries may be raised near the plantation areas on suitable locations keeping in view the availability of targets. The nursery operations should be taken up well in time so that the planting stock is available in required quantity at the right time. Now a days preference is being given to the Modern Nurseries in India to overcome the defects associated with traditional polythene bags. The specialised containers being used are made of high density polypropylene or high density polyethylene or expanded polyethylene with UV inhibitor and have 4-6 projected grooves/ ribs in their inner surface which guide the seedling roots towards the open bottom end where they are air pruned. Root trainers are available in single tubes or blocks and are reusable. An individual container supported in a tray or rack is termed as a cell or tube and together as block, in blocks, these could be available in book/ sleeve form or multi-pots in rectangular or square blocks. Root trainers are available in different sizes. There are numerous advantages associated with the use of root trainers over the conventional polythene bags.

The primary requirement of growing seedlings in containers is growing medium. Texture, bulk density and structure of growing medium play an important role in meeting the functional requirements of seedlings for water, air, mineral nutrients and physical support. Growing medium, which has high water holding capacity and continuous air supply for aerobic respiration, is ideal for seedling production.

The production and use of **Vermicompost** in forest nurseries should be encouraged. Vermicompost is natural organic manure made through the activity of earthworms on decomposed vegetable matter and cow dung etc. Its chemical composition is more superior to compost made from conventional composting pits or by bacterial decomposition. It consists of humus, which is the basic building block of fertile soil and contains all the essential macro and micronutrients for plants in readily available form. Granular in texture because of glue kind of substance the earthworm secretes and it retains its form even in water hence when used in sufficient quantity it doesn't allow the soil to pack with the result that soil is well aerated and the water from rain or irrigation reaches the deepest areas in it. Having inherent ability to check soil PH and keep it near neutral, which is essential for plant growth and being hygroscopic in nature Vermicompost is of great value and utility in forest nurseries.

**2.5.14.6. Soil conservation measures:** - Mechanical soil conservation measures like check dams, gully plugging, diversion channel, spure and other masonry structures should be constructed and completed before the closure and actual plantings. The slips and eroded areas may be treated with vegetative measures like planting of vegetatively propagated cuttings during the rainy season along-with the main plantings.

**2.5.14.7. Sowing and Planting:** - Patch sowing should be done with the first shower of monsoon. Planting of seedlings should be completed latest by 15<sup>th</sup> of

August positively and in winter it should be carried only at the places where sufficient precipitation is received, so that the plants get sufficient period of rains to establish well to with stand the post monsoon drought. The failures will be beaten up till the area have fully stocked.

**2.5.14.8. Weeding:** - Weeding shall be carried out till the plants are above the weed height and not smothered any more. At least one weeding is essential during the growth period i.e. in August/September for three consecutive year plantations.

**2.5.14.9. Cleaning:** - Cleaning should be carried out in denser patches of young regeneration comprising mainly of sapling. All material should be burnt as a fire protection measure. When the crop attains young pole stage, it is subjected to stick thinnings.

**2.5.14.10. Fire Protection and control burning:** - Internal fire lines 3-5 mts wide dividing the entire plantation area into blocks of not more than 20 ha should be cleared and maintained in addition to other existing fire lines. Chil crop will be control burnt departmentally when regeneration has attained an average height of over 2.5 mts. This will be done annually till the regeneration attains an average height of 5 mts. The boundaries of plantation/ regeneration area will also be kept clear of the inflammable material during fire season.

**2.5.14.11. Grazing and grass cutting:** - The areas to be closed for regeneration and planting, shall be allowed to grazing. The area having good regeneration and planting shall not be allowed to grazing till it is established and the plants are out of danger. However controlled grazing can be permitted where there is no regeneration. Most of forests falling under this working circle are either allowed for grazing by migratory/local graziers or allowed for grass cutting thereby affecting the regeneration. More details have been given under chapter II of Part I. It is suggested that proper control should be exercised over grazing and grass cutting so that forest which are deficient in regeneration are stocked well. A separate chapter on grazing management is included in the Plan under **Chapter VI (Part-II)**.

**2.5.14.12. Lopping and lopping rules:** - Ban-oaks are being lopped severely near the habitations and along the cultivations. This practice has damaged the Ban-oak trees and reduced the forests to degradation stage. To avoid the harmful effects of indiscriminate and uncontrolled loppings, the following lopping rules are formulated for strict compliance and to maintain the forests in good condition.

(i) Trees should be lopped on rotation of 3 years lopping cycle.

(ii) The use of axes and other heavy sharp instruments for lopping should not be allowed. Only light sickles with blades not longer than 25 cm. generally used for cutting grass should be allowed.

(iii) The lopping of any tree under 30-cm. d.b.h. should be restricted.

(iv) The lopping of the upper 1/3<sup>rd</sup> of the crown of a tree should be prohibited and the leading branch-lets on each branch should be retained.

(v) The cutting of branches over 2.5-cm. in diameter or 7.5-cm. in girth should be prohibited.

(vi) If there is any climber on the tree, it must be cut back at the base by loppers. It has been found that loppers commonly lop a tree and leave the climbers on the tree as such. This practice should be discouraged.

(vii) Lopping should be prohibited except during the lopping season i.e. from 1st November to 31<sup>st</sup> March.

(viii) Walnut, maple and bird cherry trees should not be looped.

**2.5.14.13. Monitoring and Evaluation:** -During the past much attention has not been paid towards monitoring and evaluation of plantation activities. Regular monitoring of plantation areas during the period of maintenance (i.e. 5 years) not only will help to test the suitability of the species planted to the locality but will also help in assessing the success percentage of various species. This offers an opportunity to beat up the area with other better suitable species. In case of failure of a plantation, timely action to get the area written off in order to take it up again for replanting should be initiated as per the instructions in this regard. It is therefore prescribed that regular review of plantation areas is necessary and the field agencies should accord due importance and emphasis to this aspect.

**2.5.14.14. Exercise of rights and concessions:** -The timber requirement of right holders shall be met from salvage removals. No green felling shall be permitted from the forests allotted to this working circle, especially when these are closed and planted up. The un-restricted grazing shall have to be checked and stall feeding of domestic animals be encouraged.

**2.5.14.15. Resin tapping:** - The resin tapping is banned completely in all the forests allotted to this working circle at least for the period of this plan.

## **2.5.15. INVASIVE ALIEN SPECIES: STRATEGY FOR CONTROL AND REHABILITATION OF AFFECTED AREAS:**

**INTRODUCTION:** - Biological invasions – one of the anthropogenically mediated ecological perturbations – are threatening native biodiversity, preventing natural ecological succession and changing the community structure and composition, besides impacting ecosystem services. *Lantana camara* is perhaps one of the most important invasive alien plant species (exotic weed) in forest ecosystems of India as also in Palampur Forest Division. Other alien invasive plant species with significant impact on the forests of Palampur Division include *Parthenium hysterophorus*, *Eupatorium* (= *Chromolaena*) *adenophorum*, and *Ageratum conyzoides*. Whereas the incidence of *Parthenium* popularly known as ‘Congress Grass’ is largely restricted to degraded and newly opened drier sites along roads and forest fringes, the other three invasive alien species

tend to occupy all possible vacant places even under tree canopy. Even as *Eupatorium* and *Ageratum* show a clear preference for moister locales and show gregarious occurrence, at many places these share the niche and grow in an intimate mix with *Lantana*.

A reconnaissance was made during January 2011 to map the distribution of exotic weeds in various compartments in this Division. Whereas, it was possible to record the incidence of *Lantana* fairly accurately, the area infested with the other 3 main invasive alien species could not be recorded comprehensively due to these species being still in dormant condition. Table 2.5.6 gives spread of *Lantana* infestation.

**Table: 2.5.6. Range-wise *Lantana* infestation in Palampur Division**

Sr. No.	Name of Range	Area in ha.
1	2	3
1	Bailnath	2516.66
2	Daroh	506.62
3	Palampur	4843.95

Source: Palampur Forest Division.

#### **2.5.15.1. CORE PRINCIPLES OF THE STRATEGY:**

- **CONTAIN FURTHER SPREAD:** *A close watch over the spread of exotic weeds will be kept through biennial monitoring mechanism and necessary corrections in the program will be made to remove the recent infestations on priority basis.*
- **COMPLETE REHABILITATION OF INFESTED AREAS:** *It will involve shift from 'one time removal of weeds' to 'complete rehabilitation' of the treated areas by competing/ shading out exotic weeds. All noxious exotic weeds on any given area will be tackled simultaneously.*
- **RELIANCE ON ONLY MECHANICAL/MANUAL METHODS:** *In view of their environmental/ ecological concerns, the rehabilitation measures will NOT employ any Chemicals/ Biological methods of exotic weed control.*
- **NATURAL RESILIENCE OF NATIVE FLORA TO BE THE BASIS OF REHABILITATION ACTION:** *The natural regeneration of indigenous plant species on treated sites will be encouraged and facilitated to establish towards better environmental and ecological services, including fodder, fuel, water recharge, etc.*
- **NO EXOTIC SPECIES TO BE USED TO REHABILITATE TREATED SITES** *No potentially invasive exotic species – (viz. *Leucaena leucocephala*, *Prosopis juliflora*, *Jatropha curcus*, *Tecoma stans*, etc.) - will be used for plantation in the areas under rehabilitation, because of their deleterious effect on the native flora.*



- **REHABILITATION TO START FROM LOW INTENSITY INFESTATION AREAS AND TO PROGRESS TOWARDS AREAS WITH HEAVY INFESTATION:** *Rehabilitation activities will start from the fringes of infestation zone with lower intensity infestation and will progress towards the heavily infestation areas. This approach will (i) allow tackling larger areas with the given financial resources and result in creating quick visible impact, and (ii) help in containing further spread of exotic weeds.*
- **SELECTIVE PRIORITY REHABILITATION OF HEAVILY INFESTED CRITICAL HABITATS:** *Rehabilitation of heavily infested areas as starting point will be taken up only in limited number of carefully selected **critical habitats** like grazing grounds near habitations. Such sites will then act as nucleus from where rehabilitation activity will radiate to adjoining areas of high infestation.*

With the above mentioned core principles of the strategy, the approach/ plan to implement the strategy will be as under:

**2.5.15.2.MANAGEMENT OF LANTANA** With the major focus of the management strategy on ‘containing further spread’, a two pronged approach, as described below, will be followed in tackling *Lantana* menace on forest lands.

- **APPROACH-I (FOR AREAS WITH LOW INFESTATION INTENSITY)** More than 60% of the forest areas recorded to be under *Lantana* have been infested with this exotic weed within the past 10 years and have less than 25% intensity of infestation. Under this approach, these areas will be tackled on priority basis for the reasons that (i) with the given financial resources, it would be possible to rehabilitate larger areas for creating significant impact, and (ii) further spread of this exotic weed would be contained.

The rehabilitation activities will be started from the fringes of infestation zone with low intensity infestation and will progress towards the high infestation areas. Major activities under this approach will be manual cutting of *Lantana* bushes and encouraging establishment of local species, including grasses or augmenting populations of native species through plantation.

- **APPROACH-II (FOR AREAS WITH HEAVY INFESTATION):** Under this approach, critical areas under heavy infestation, especially the grazing grounds near habitations, will be identified and treated.

The rehabilitation activities will start from the selected critical area that will act as nucleus, and will radiate from this nucleus to cover adjoining areas of high infestation. Major activities under this approach will be manual cutting of *Lantana* bushes, encouraging establishment of local species, including grasses and planting the areas with tall plants of fast growing species to quickly shade out *Lantana*.

The methodology to implement the above two approaches will be as follows:

- Method of cutting *Lantana* will be Cut Root Stock (CRS) method i.e. cutting the bushes below the soil to prevent coppicing. (**See below for details**).
- Forest beat will be the unit for rehabilitating *Lantana* infested sites. Financial resources available under various schemes will, therefore, be converged towards this end.
- Local people, through existing community groups, will be encouraged to participate in rehabilitation of *Lantana* infested areas. Stake of local people will be built into this initiative under the available JFM instruments.
- The following will be, based on local practices, standardized for effective implementation of *Lantana* management initiative:
  - Cutting tools/ techniques
  - Calendar of rehabilitation activities
  - Cost models
- A three year active maintenance of the treated areas and triennial follow up thereafter will form integral part of the rehabilitation program till the areas gets fully rehabilitated. During this period, constant vigil will be maintained on any opportunistic springing back of sprouts/ seedlings of the invasive alien species and the same will be immediately removed. At the same time, progress of establishment of the native species will be actively monitored and encouraged.
- An average of 200 hectares of *Lantana* infested areas will be taken up for rehabilitation per year.

#### **2.5.15.3 MANAGEMENT OF OTHER INVASIVE ALIEN SPECIES (*PARTHENIUM*, *AGERATUM*, *EUPATORIUM*)**

The spread of these three species is largely restricted to the open lands including forest fringes, degraded pastures and areas having soils that are recently exposed due to landslips, erosion, soil cutting or muck dumping. The reconnaissance has shown that there is a large overlap of areas under different invasive alien species with these three abnoxious weeds also occurring, though each of these occupying different niches, in most of the forests that are infested with *Lantana*.

The basic approach to rehabilitate areas infested with these three invasive species will be as under:

- **APPROACH-I (AREAS WHERE INFESTATION OVERLAPS WITH *LANTANA*):**  
Such situation occurs under Chil, miscellaneous broad-leaved and scrub forests. In such areas removal of these three exotic weeds will be taken up simultaneously with removal of *Lantana* and the treated areas rehabilitated with fast growing native species/ grasses.

- **APPROACH-II (AREAS WHERE THERE IS NO OR LITTLE LANTANA INFESTATION):** Such situation usually comes across in pastures, degraded forests and recently exposed sites. In such areas, manual uprooting of these exotic weeds just on the onset of monsoon, when the soil is moist, will be employed.



### **Lantana uprooted in Baijnath Range**

**2.5.16. SOIL AND MOISTURE CONSERVATION:** The main objective is to protect hill slopes from further denudation/erosion and to maintain the equitable flow of water in the rivers, streams, perennial *nallas* that originate from these hills, thus constant efforts should be made to maintain and increase the protective vegetative cover in such areas. These forests shall, therefore, be simply protected as such. No felling shall be carried out even salvage removals as these areas are highly prone to soil erosion owing to steep slopes. The grazing in these forests is required to be regulated. The rotational closures supplemented with some soil conservation measures in the eroded areas would improve protective vegetative cover. Most of the forests in lower elevations are poorly stocked, carry scattered tree growth or are devoid of adequate vegetation cover. Such areas shall be tackled by sowing, planting of suitable species and carrying out soil conservation works. The growing stock of ban oak forests is on the decline especially near the habitations. These forests can be regenerated by artificial means.

### **METHOD FOR REMOVAL OF LANTANA**

**Removal of adult clumps using ‘Cut Root Stock’ (CRS) method:** This method involves cutting the main tap root of *Lantana* plant beneath the ‘coppicing zone’ (transition zone between stem base and rootstock). This method of removal involves engagement of 2–3 individuals to work in a group for the removal of *Lantana* if the clumps are too large to be handled by one individual after the rootstock is cut. The steps involved in the cut rootstock method are:

- (i) The person, who engages in removal of *Lantana*, is positioned in a way that he stands near centre of the *Lantana* clump with his back facing the clump and holding the handle of digger (kudal)

- (ii) Using the specially designed digger, the person cuts the main rootstock of *Lantana* 3–5 cm below the soil surface by hitting the rootstock 3 or 4 times; while hitting the rootstock the blade of the digger gets lodged into the main tap root, and at this point it is useful to move the handle of the digger in the forward direction away from the body of the person so as to sever the connection of the clump with the main tap root. In case the clumps of *Lantana* form impenetrable thickets, it is advantageous to cut the rootstocks of 3–4 contiguous clumps to make the removal operation convenient. It may be noted that the branches of *Lantana* clumps should not be slashed/cut to gain access to the centre of the clump for its removal by cut rootstock method. The branches of *Lantana* thicket formed by more than one clump should be lifted and tipped over from one end by using a wooden or bamboo pole of about 1.5–2.5 m long and diameter 5–6 cm which is inserted just below the branches from one side and rolled over easily by two workers holding the pole at either end and pressing it so as to reach the centre of the clump. Such manual handling of impenetrable thicket is possible because of the umbrella type of canopy which makes it difficult to reach the centre of clump easily. Such physical maneuvers minimize or prevent regeneration from rooted cut branches when they fall on the ground.
- (iii) Lift the clump/s and place the clump/s upside down. If the clump is not placed upside down, the prostrate rooted branches and the aerial old branches having aerial roots at nodes may develop into adult plants when they come in contact with the soil. Therefore, the upside-down orientation of cut clumps is critical in the prevention of regeneration of *Lantana* from cut clumps. It may be noted that *Lantana* does not produce root suckers.
- (iv) After drying the clumps, the clumps may be used as fuel or burnt at the same site or all the dried clumps may be collected at one place and then burnt. The best time for removal of *Lantana* is just before rainy season, i.e. when the plants are not in flowering and fruiting.

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## CHAPTER- VI

### THE GRAZING OVERLAPPING WORKING CIRCLE

#### 2.6.1. GENERAL CONSTITUTION AND CHARACTER OF THE

**VEGETATION:** - This working circle overlaps all other working circles and covers an area of 38,805.51 ha. The general character of the vegetation has been described in under respective working circles and **Chapter-II (Part-I)**. From grazing point of view, the entire area can be divided in zones viz; Higher, Middle and Lower.

**2.6.2. HIGHER ZONE:** - It extends from 2000 m upwards and confined to Baijnath and Palampur Ranges. The main species of fodder value are *Quercus* spp. *Acer* spp, *Prunus* spp. *Morus serrata*, *Pyrus pashia*, *Arundinaria falcata*, *Celtis australis*, *Olea cuspidate*, *Robinia pseudoacacia* etc. The herbs, shrubs and climbers which are important source of fodder are *Indigifera* spp. *Berberis* spp. *Trifolium* spp. *Ranunculus* spp. *Polygonum* spp. *Viola* sp. *Fragaria* spp. and *Clematis* spp. During the period of acute shortage of fodder, less palatable species such as *Pistacia itegerrima* and *Cedrella* spp. *Salix* spp etc are also lopped. Goats do browse even *Rubus niveus*, *Jasminum officinale* and *Cotoneaster* spp. Grasses such as *Agropyron* spp. *Bromus* spp. *Chrysopogon martinii*, *Themeda* spp. *Dicanthium annulatum*, *Dactylus glumerata*, *Festuca* spp are grasses of importance.

**2.6.3. MIDDLE ZONE:** -It extends from 1200 m. to 2000 m. The common species for fodder and grazing are *Quercus* species, *Pyrus pashia*, and *Morus serrata*, *Rhus* spp. *Ficus* spp. *Salix* spp. *Sapium* spp. *Albizia* spp. *Desmodium* spp. and a large number of ferns, grass such as *Chrysopogon fulvus*, *Heteropogon contortus*, *Themeda anathera*, etc. *Bauhinia* climbers are also used as fodder.

**2.6.4. LOWER ZONE:-** It lies below 1200 m. and contains a large number of fodder trees and shrubs etc. but provides poor grazing and fodder due to the influx of large number of migratory goats and sheep in winters. The principal fodder trees and shrubs are *Acacia catechu*, *Morus alba*, *Cassia fistula*, *Pyrus pashia*, *Cedrella toona*, *Albizia stipulata*, *Anogeiusus latifolia*, *Oogeinia oojeinensis*, *Bombax ceiba*, *Kydia calycina*, *Melia Azadarach*, *Bauhinia variegata*, *Celtis australis*, *Grewia oppositifolia*, *Butea monosperma*, *Terminalia* spp. *Zizyphus* spp and bushes of *Carissa* spp. *Flacourtia* spp and *Berberis* spp. In periods of scarcity, species such as *Syzygium cuminii* *Mangifera indica*, *Ficus religiosa*, *F. bangelensis*, *Butea* spp. *Dalbergia sissoo* are also lopped. Some plants are important in indicating the biotic factors. The species avoided by cattle, if form the chief composition of the stand, indicates excessive grazing and browsing of the area. The spines bearing species like *Carissa opaca*, *C. spinarum*, and *Zizyphus* spp are indicators of heavily grazed areas.

The grazing requirements of the area are further supplemented from agricultural waste from wheat, maize, rice etc. The leaves of *Bauhinia vahlii* and *Dendrocalamus strictus*, *D. hamiltonii* are prized fodder. The principal fodder grasses of the area are *Saccharum* spp. *Heteropogon contortus*, *Andropogon* spp. *Bothriochloa pertusa*, *Themeda anathera*, and *Chrysopogon montana*, *C. martinii* and *C. fulvus*.

**2.6.5. BLOCKS AND COMPARTMENTS:** - These remains the same as covered under various working circles already dealt with.

**2.6.6. SPECIAL OBJECTS OF MANAGEMENT:** - These are:

(i) To meet the legitimate requirement of right holders and local people as laid down in settlement records for grazing and fodder consistent with production and bearing capacity of different areas.

(ii) To improve the productivity of areas so as to ensure the continuous supply of forest produce to the people.

(iii) To regulate grazing in these areas according to their carrying capacity.

**2.6.7. SILVICULTURAL SYSTEM:** - Forest areas will be managed in accordance with the prescriptions of the concerned working circle to which allotted. This working circle is concerned with the management of grazing, grass cutting and lopping etc. the question of adopting any silvicultural system, felling cycle etc. for this limited purpose does not arise.

**2.6.8. GRAZING:** - The incidence of grazing is not uniform all over the tract. Areas near habitations, along the roads, paths and migratory routes are heavily grazed. The right holders may graze their cattle in both demarcated Protected and Un-demarcated Protected Forests. However, there is no limit to the number of cattle to be grazed. As to the sheep and goat grazing, the right holders may graze any number of such animals as are required for his domestic and agricultural (excluding pastoral) purposes, or a number of equal to 30% more than the number recorded at **O'Brein's** assessment of land revenue in 1892, whichever is greater. All types of forests cater to the grazing requirement of domestic as well as migratory graziers as discussed below.

**2.6.9. DOMESTIC GRAZING:** - It is practiced in all the villages. In this case, the local villagers keeping all categories of animals for agricultural and domestic requirements can graze them in the adjoining government forests all the time without any limit as per revenue Settlement Records.

**2.6.10. NOMADIC AND MIGRATORY GRAZING:** - The "Gaddies" who generally belong to Chamba but, in some cases, have settled in Kangra to become entitled to all the rights of users, are true shepherds. The rich pastures on the

southern slopes of Dhauladhar provide autumn and summer grazing to these shepherds. In addition to local people, others who keep large number of buffaloes, sheep and goats for commercial purposes, can graze their herds in Alpine Pastures/temperate meadows and high-level forests during summer and rainy seasons. This category includes migratory Gujjars and Gaddies besides local people. Grazing in these areas is permitted on payment of fees for each category of animals.

**2.6.11. GRAZING LANDS:** - The term Grazing lands, Rangelands and Pastures are used loosely to symbolise the grazing grounds. In true literary sense, the grazing grounds of Palampur Forest Division hardly meet the requirement of such nomenclatures, which are defined below (Shrivastava et al, 1988).

**Grazing lands:** - Natural land surface predominantly covered with “Grass” the wild member of the family “**Gramineae**”.

**Rangelands:** - Natural grass lands.

**Pastures:** - Grassland areas artificially established to tame forage plants.

**2.6.12. PRESENT STATUS OF GRAZINGLANDS:** - The village grazing lands are overgrazed by ever increasing livestock population, which reduces their regeneration capacity and keep them at a level of low productivity. For most of the year, these lands give the appearance of playgrounds for cattle. The forests lands confined to the fringes are excessively grazed. Trees are heavily lopped. Trees have gradually been replaced by shrubby growth. Vegetal cover has been removed and the soil is exposed to accelerated erosion. As a result barren patches have developed over vast areas and soil erosion has become a serious problem. These grazing lands are subjected to severe biotic interference, where continuous and uncontrolled grazing and deforestation have altogether lead to the elimination of palatable grass / legume species and resulted dominance of unpalatable and undesirable grasses and bushes. The herbage species found in these grazing lands represent the third or fourth stage of degradation. The present level of production of most of the pastures is about 25% or less of their actual potential. The dry matter yield, fresh herbage yield of Bara Banghal is 17.19 qtl/hac. and 49.60 qtl/hac. respectively (Study by Dr.B.S. Katoch and Dr.K.K. Dogra). Fires have further deteriorated the whole ecosystem and non-palatable species dominates.

**2.6.13. CAUSES OF DETERIORATION:** - The main causes of deterioration of these alpine pastures / grazing lands are as under: -

- (i) Over grazing.
- (ii) Premature grazing.
- (iii) Continuous grazing.
- (iv) Trampling.
- (v) Selective feeding.
- (vi) Bad distribution of cattle.

**2.6.14. ECOLOGICAL STATUS:** - There are various grassy / shrubby areas with in tree limit zone. These are as such since long, but cannot be accorded climax status, because, with the incidence of heavy grazing, the forests have disappeared at these places and the areas have been converted to grass lands and bushy scrub growth. Such areas / grazing lands are bio-edaphic and can be regarded as **sub-climax** vegetation. The change in grasses / herbs, however, is expected to continue in future. Those grassy patches, of course, which are on precipitous slopes with shallow soil, can be accorded **climax** status, as there seems no chance of tree cover. Most of the grazing lands and degraded forests are thrown back to succession through several stages of regressive deterioration. Thus grasslands are maintained under the influence of fire and grazing of varying intensities and combinations.

**2.6.15. FODDER PRODUCTION:** - Most of the farmers depend on forests, grasslands, crop residues and tree leaves as source of fodder for their livestock. Natural grasslands include common grazing lands, forest plantations and protected areas for hay harvesting. Growth starts with the onset of first monsoon, reaching peak in September and mature by the end of October and for the rest of the year remain dormant. During this period the animals have mostly dry fodder. Hay cutting starts in October when most of the grass is mature. Dried grass is collected and kept in heaps or tied with the trees.

**2.6.16. GRASS PRODUCTION:** - Due to lack of improvement and proper management, the productivity of grass (dry matter) per ha. is very low in these alpine pastures / grazing lands. The productivity is subject to altitudinal differences as is evident from the study undertaken by H.P.K.V.V. Palampur in sub-tropical zone during 1975, the results of which are tabulated as below in Table 2.6.1.

**Table: 2.6.1. Forage yield from grass lands at different elevations (Singh et al 1975).**

Sr. No.	Altitude (meters)	Forage yield (qtls per hac.)	
		Fresh.	Dry.
1	675	127.00	50.40
2	1,000	124.50	47.80
3	1,354	113.20	47.20
4	1,675	148.00	49.00

Similarly, while conducting study on carrying capacity of pastures of Kangra and Shimla districts, by Dr. B. S. Katoch and Dr. K. K. Dogra, Department of Animal Nutrition, H.P.K.V.V. Palampur, dry matter production under natural conditions from three different selected sites during 1989 to 1991 is tabulated in Table 2.6.2.



**Table: 2.6.2. Dry matter production from three different sites, (qtls per hac)**

Name of sites.		
Palampur altitude (1127.80 m.)	Phuttakhal* altitude (1981.20 m.)	Bara Bhanghal altitude (3170 m.)
1	2	3
61.45	31.97	17.91

\*Phuttakhal site falls in Jogindernagar Forest Division and Bara Bhanghal in sanctuary area.

Since, the Palampur site was well protected as compared to the natural grasslands, which are open to uncontrolled grazing, the dry matter production is much higher as compared to other sites.

**2.6.17. CHEMICAL COMPOSITION AND NUTRITIONAL STATUS OF HERBAGE:** - It depends on botanical composition, stage of maturity, soil fertility etc. Legumes are almost absent in grazing lands. Table 2.6.3 shows the relative composition of different grasses and associated species in natural grasslands (Singh et al\*1975).

**Table: 2.6.3. Chemical composition of some important grasses (% in dry matter)**

Grasses.	Dry Matter	Crude Protein	Ether Extract	Crude Fibre	N Free Extract	Total Ash	Ca	P
1	2	3	4	5	6	7	8	9
Chrysopogon gryllus	34.7	9.51	2.23	32.53	46.57	9.16	0.51	0.10
C. montanus.	39.9	8.56	1.75	32.53	44.74	12.4	0.47	0.16
Arundinella nepalensis.	35.6	9.30	1.27	35.41	47.77	8.25	0.41	0.10
Themeda anathera	37.8	7.26	1.87	34.45	45.74	10.7	0.48	0.10
Bothriochloa intermedia.	32.7	7.07	1.85	33.96	49.43	7.69	0.42	0.13
Heteropogon contortus.	41.8	6.43	1.86	36.92	46.79	8.00	0.42	0.11

\*Source: H.P.K.V.V. Palampur. (Singh et al).

**Table: 2.6.4. Mean value of important constituents of grasses during various stages of growth (% in dry matter) (Singh et al).**

Constituents	May / June	July / August	September / October
Crude Protein	9.08	8.17	5.01
1	2	3	4
Crude Fibre	31.48	35.30	37.09
Calcium	0.58	0.43	0.37
Phosphorus	0.15	0.10	0.08

Source: H.P.K.V.V. Palampur. (Singh et al).

Dr. B.S. Katoch and Dr. K.K. Dogra, Department of Animal Nutrition, H.P.K.V.V. Palampur, while conducting studies on carrying capacity of the selected pastures of district Kangra, collected herbage samples from two selected sites during September, 1989, July, 1990, August, 1990, September, 1990, processed and analyzed for chemical composition. The results are given below in Table. 2.6.5.

**Table: 2.6.5. Mean value of chemical constituents (% in dry matter) of Palampur site. (Katoch et al)**

Constituents.	September 1989.	July 1990.	August 1990.	September 1990.
1	2	3	4	5
Dry Matter.	63.55	40.81	49.01	52.92
Crude Protein.	3.54	4.06	3.72	3.44
Crude Fibre.	34.03	36.45	39.46	39.59
Ether Extract.	0.79	2.24	2.20	2.06
N Free Extract	54.82	51.16	49.90	49.83
Total Ash.	6.79	6.08	4.71	5.08
Silica.	4.49	3.93	3.20	3.20

Source: H.P.K.V.V. Palampur. (Singh et al).

From the perusal of data in Table 2.6.5 indicates that dry matter and crude fibre increased from July to September, whereas, crude protein, N free extract and total ash decreased from July to September.

**Table: 2.6.6. Mean value of chemical constituents (% in dry matter) of Bara Banghal site (Katoch et al) 1990 to 1992.**

Constituents.	1990 (Mean of August and September)	1991 (Mean of August and September)	1992 (Mean of August and September)
1	2	3	4
Dry Matter.	16.43	14.18	19.44
Crude Protein.	8.32	10.37	9.19
N detergent Fibre.	61.26	65.50	66.85
Silica.	4.44	4.15	3.95
Total Ash.	8.64	8.37	9.41
Calcium.	0.90	0.97	1.00
Phosphorus.	0.20	0.22	0.22

Source: H.P.K.V.V. Palampur. (Singh et al).

The data revealed that average dry matter production under natural condition is higher at Palampur site to that of Bara Banghal whereas crude protein and ash contents are higher at Bara Banghal site. The overall nutritional status of herbage at Bara Banghal is better as compared to that of Palampur due to higher levels of nutritionally desirable components and trace minerals.

The macro mineral (% in dry matter) and trace minerals (mg/kg dry matter) as analysed for Palampur and Bara Banghal sites during 1991 and 1992 (Katoch et al) are tabulated as under in Table 2.6.7.

**Table 2.6.7. Average value of macro and trace minerals for Palampur and Bara Banghal sites. (Katoch et al)**

Parameters.	Average of 1991 and 1992 for Palampur site.	Average of 1991 and 1992 for Bara Banghal site.
1	2	3
Macro Minerals (% in dry matter).	% age	%age
Total ash.	5.85	8.89
Calcium (Ca).	1.42	0.98
Phosphorus (P).	0.15	0.22
Trace Minerals (mg/kg in dry matter).		
Iron (Fe).	302.35	572.50
Copper (Cu).	10.25	6.98
Zinc (Zn).	75.38	50.58
Manganese (Mn).	62.43	124.08

Source: H.P.K.V.V. Palampur. (Singh et al).

The nutritional status of herbage is better at Bara Banghal as compared to that of Palampur due to the higher levels of nutritionally desirable component and trace minerals, which was substantiated by the higher growth rates of grazing sheep. The trace minerals status of herbage is adequate except for copper, which is low. So supplementing of copper as copper sulphate through concentrate is a must for the grazing stock.

**2.6.18. ANIMAL UNITS:** - The animal unit is the conversion of grazing animals to obtain a single measure for the pasture requirements of the herd for comparison with the carrying capacity of the land. The cow is taken as standard i.e. 1 animal Unit. The conversion factors for various livestock are given in Table: 2.6.8.

**Table: 2.6.8. Conversion factors of Animal Units**

Livestock.	Details.	Animal Units.	Remarks.
1	2	3	4
Cattle	Cow	1.0	Average for cattle of all types is equivalent to 1.0 Animal Unit.
	Breeding Bull / Oxen	1.2	
	Cattle above 3 years	1.0	
	Cattle below 3 years	0.6	
Buffaloes	Buffalo	1.5	Average for the

	Bull	1.8	buffaloes of all types is equivalent to 1.5 Animal Unit.
	Buffalo below 3 years	1.5	
	Buffalo above 3 years	0.8	
Others	Horse	1.0	Average of this category of animals is equivalent to 1.0 Animal Unit.
	Ponies	1.0	
	Mules	1.25	
	Donkeys	0.75	The number of animal units on a cattle basis is calculated by multiplying the live weight of sheep or goat by 1.5 and dividing by the live weight of the reference cow (180kg.) assuming average 30 kg. of sheep and 40 kg. of goat.
Sheep	Sheep	0.25	
Goat	Goat	0.30	

**2.6.19. STOCKING RATE:** - Sheep and goat grazing has been discussed in detail in **para 1.1.15 (Chapter-I)**. The cattle population and record of sheep / goat grazing for various years have been given in **para 1.3.4. (Chapter-III)**. These figures for the year 2010 are reproduced as under in Table: 2.6.9.

**Table: Livestock Population in Palampur Division.**

Category	Cattle	Buffaloes	Sheep	Goats	Misc.
1	2	3	4	5	6
Animals belonging to residents.	1,09,411	25,435	83,762	66,165	2,737
Animals belonging to the professional getting grazing permits in this Div.	-	-	14,646	13,298	4
Total.	1,09,411	25,435	98,408	79,463	2,741

Source: District Land Records 2009-10

In addition to above, about 1.25 lac. Sheep and goats of migratory graziers pass through this forest division.

Using the conversion factor, total number of animal units for the division is 1,98,745 Animal Units as given in Table: 2.6.10.

**Table: 2.6.10. Total number of Animal Units in Palampur Division**

<b>Livestock</b>	<b>Numbers</b>	<b>Animal Units</b>
<b>1</b>	<b>2</b>	<b>3</b>
Cattle	1,09,411	1,09,411
Buffaloes	25,435	38,152
Sheep	98,408	24,602
Goats	79,463	23,839
Others (misc.)	2,741	2,741
Total.	3,15,458	1,98,745

Source: District Land Records 2009-10

**2.6.20. GRAZING INCIDENCE:** - For 1,98,745 Animal Units, the total available forestland is 38,805.51 ha. It gives an average grazing incidence of 5.12 A.U. per ha. i.e. per animal unit the available grazing land is only 0.19 ha.

**2.6.21. CARRYING CAPACITY OF GRAZINGLAND:** - The Director, H.P. State Land Use and Wasteland Development Board sanctioned a project regarding "Studies on the carrying capacity of the selected pastures of Kangra and Shimla district". The main objectives of project were, to evaluate the carrying capacity of selected units, to suggest measures for increasing the carrying capacity of these selected units, to obtain comprehensive information on the nutritional status of herbage of these selected units and to identify different species of grasses, fodder and fodder trees in the selected units. The studies relating to the carrying capacity of natural grasslands in Kangra and adjoining district of Mandi was taken up By Sh. B.S. Katoch and Sh K.K. Dogra of Department of Animal Nutrition College of Veterinary & animal Sciences H.P.K.V.V. Palampur. The carrying capacity of three selected sites was worked out by conducting grazing experiments with cattle at Palampur and with sheep at other sites. The type of animals used was as per the normal practice of grazing by the local people at each site. The carrying capacity of Palampur site was worked out to be 1.31 Animal Units/ha/annum.

Thus, the grazing incidence in Govt. forests for the division as a whole, in terms of animal units comes to 5.12 Animal Unit/ha/annum i.e. per animal unit the available grazing land is only 0.19 ha. However, Grazing Advisory Committee has recommended a grazing incidence of 2 ha. per cow unit. Thus, the total requirement of land comes to 3,97,490 ha, against available area of 38,805.51 ha. The pressure of grazing is manifold folds beyond the carrying capacity of the area and unfortunately is on the increase. This suggests the need for the drastic

reduction in number of livestock and improvement of forests, grass and grazing lands.

**2.6.22. PROBLEMS IN MANAGEMENT OF GRAZINGLANDS:** - The problems arising in the management of grazing lands are protection, high cost, people's participation, proper grazing system and poor site conditions. Protection against intensive grazing is essential as this result in the disappearance of perennial grasses giving place to obnoxious weeds. After protection, shrubs and weeds invade the area quickly. Weed control is costly and uneconomic. Deferred grazing is the urgent need to improve the grasslands with desired species. Suspension in grazing rights including reduction in it is essential. This can be achieved through active participation of people, as reduction in cattle population is a social and politico-religious problem. Tree leaves are extensively lopped. Migratory graziers frequently visit forestlands. The leguminous component is confined to low quality annuals. Stall-feeding is lacking. Indiscriminate lopping and cutting of trees destroy the normal forests. These lands require silvi-pastoral management for fuel and fodder species. The fire causes desiccation of soil, kills the micro flora hamper ecological succession, making the sites poorer.

**2.6.23. IMPROVEMENT AND MANAGEMENT OF GRAZINGLANDS:** - the objective is to obtain the maximum production of livestock without decreasing the productivity of the grasslands. The improvement programme consists of:

**2.6.23.1. Livestock Management:**

**(i) Reduction in number of cattle:** -The cattle should be distinguished into essentials and non-essential. Encouraging the breeding of only better breeds should control the cattle population. Livestock may be reduced stall-fed upgraded cattle and buffalo which reduce the grazing pressure and increase the animal manure and milk production. Heavy grazing fees should be charged for non-essentials while essentials can be allowed to graze free. Herding the cows and bulls separately should prevent unwanted breeding. Limits of cattle should be fixed on the basis of land possessed by a family.

**(ii) Improvement of cattle:** - this can be done by replacement of nondescript local cows with jersey cross breeds, painless castration of the scrub bulls, introduction and use of better breeds of cow and buffalo bulls, and use of artificial insemination on local cows and buffaloes to upgrade the milking herd of farmers.

**2.6.23.2. Grazing Management:** - In the planned grazing management two important principles are followed. These are (a) utilizing grass at a time when the growth and reproduction is least interfered with. (b) Utilizing the grass when it is most palatable and nutritious. Grazing should be planned in such a way that the cattle benefit themselves of the early nutritious growth of the grass without impairing their growth, vigour and regaining power. This can be achieved by safeguarding the divergent needs of the cattle, grass, and the man, as discussed below.

**(i) Grazing load:** - Grazing have been very liberally allowed and is ill defined in the Un-demarcated Protected Forests. The right-holders can keep and graze any number of cattle. Some restrictions on the grazing rights, therefore, need to be imposed by way of suitable statutory measures. Strict control over the number of animals is the first essential principle. In fixing the number of animals, carrying capacity is taken into consideration. This is determined on the basis of botanical composition, plant cover density, plant vigour and the quality of available palatable forage in an average season. It varies from 2.5 to 8 cattle per ha. in poor to moderately good grasslands. Grazing load suitable during average rainfall year is too heavy during drought.

**(ii) Kind of cattle:** - Mixed grazing results in the most uniform utilization of the forage. Selective grazing adversely affects the quality of pasture. One of the rules for maintaining a uniform grass-legume mixture is to graze it all down close at least once a year. Better herding methods can minimize the goat damage. Thus various kinds of cattle should be balanced with proportional mixture to maintain the grazing grounds properly.

**(iii) Grazing distribution:** - Animals should be distributed properly to avoid localized over and under grazing. A good and proper distribution of stock watering palaces is an effective means of spreading the grazing load over all parts of a pasture. Placing salt in remote corners will bring about better distribution. Occasional shifting of cattle and frequent moving of bed grounds are also desirable to secure better distribution.

**(iv) Time of grazing:-** Grazing should be light during the initial growth stage and right time to graze depends on the kind of range and its condition. In submontane Himalayas the grasses should be grazed before seed shed.

**Grazing Methods:-** Continuous grazing has to be deferred. This is not possible in the entire area at the same time. As all the grazing lands except Delimited Protected Forests falls in the Undelimited Protected and Unclassed Forests, rotational and deferred grazing will be a problem, but the same can be achieved through extensive people's participation. The deferment in a part of area and grazing in the rest has evolved the following methods:

**(i) Deferred grazing:-** It is applicable to areas predominant in perennial grasses. The area is divided into three parts. One part is closed while two other parts are allowed to graze. The animals are shifted to close one portion before the grasses become over ripe, coarse and less palatable. This helps in dissemination of seed for germination. Each year one compartment gets rest and enables the plants, grasses to recoupe vigour.

**(ii) Rotational grazing:-** It involves systematic transfer of animals at suitable intervals from one portion to other. The aim is to give each part a chance

of regeneration itself. Diagrammatical rotational closures and grazing schemes for various types of grazing lands have been provided by Gorrie (1941).

**(iii) Deferred and rotational grazing:-** It is applicable to areas dominated by annuals and where occasional seeding of perennials is essential to maintain the cover density. The area is divided into three compartments. Rotational grazing is carried out in such a way that each compartment is grazed for half of the grazing season and protected subsequently till the maturity of seeds.

**2.6.23.3. Management of Grazing lands:-** Due to continuous and heavy incidence of grazing these pastures are deteriorating and are not likely to meet the ever-increasing requirements of forage. To increase the productivity and condition of these grazing lands following techniques are suggested:

**(i) Closure:-** It leads to progressive succession and increase in productivity of the area under closure. Rotational grazing and closure showed better growth of vegetation, availability of young and nutritious grasses continuously, gradual disappearance of coarse and inferior grasses and reduction in soil erosion. Experiments conducted at Bhatta indicated the increased grass production from 2.1 t/ha to 8.7 t/ha simply by 2-3 years closure (Gupta 1980).

**(ii) Soil and water conservation measures:-** Studies conducted at CAZRI, Jodhpur revealed that contour furrows (25cm deep, 60cm wide) spread at 8-10 meter apart resulted in 638.7% increase in forage production (Singh 1977). Contour trenching (23-15cm) at 8meter interval with vegetative bunds of hybrid Napier recorded a maximum yield of 11.9 t/ha of natural grass and 4.2 t/ha Napier (Gupta1980).

**(iii) Weed control: -** The weeds compete the forage crops in nutrient uptake and smother them. As a result the forage production is reduced considerably. Bush free grasslands produced 3,520 kg/ha of grass against 850 kg/ha from grasslands with bushes (Shankarnarayan1974).

**(iv) Re-seeding: -** The choice of grasses species for different regions have been given by Singh et al. (1975), (1979) and Gorrie (1946). Indigenous species are relatively low yielder as compared to exotics. For various altitudinal zones in Himalayas, improved grasses, legumes and tree species have been recommended by Gupta (1980), Singh (1979), and Kochar and Tandon (1982). Digitaria decumbans and Chrysopogon fulvus are important local grasses and fit for reseeding as the former is a good seed producer and the later has more protein content in all stages of growth (Gupta and Puri 1979).

**(v) Legume introduction: -** It should be ensured that held over feed after the monsoon grazing contains necessary legumes to make it acceptable to cattle during winter and summers. If a range contains half legume during autumn, it will provide feed of best quality readily acceptable to cattle. Protein content of the



grasslands could be raised from 2% in pure grass cover to 6% in herbage mixed with legume (Shankarnarayan 1974). An introduction of Siratro and kulthi legumes raised the protein content of the mixed hay cut at ripe stage over 6% compared to about 2% of the pure hay (Dabadghao 1972).

**(vi) Liming, fertilization and manuring:** - Addition of manures/fertilizers and lime not only maintains the fertility of the soil but also increases the yields of the grasses and legumes. Application of 15 kg nitrogen and 20 kg super phosphate increased 44% yield over the control plot at experimental station Paighar (Mumbai). Dabadghao et al (1965) reported increase of 24% to 47% in forage yield of different grasses by application of 22.4 kg/ha of nitrogen and phosphorus. Application of 60 kg N/ha increased the yield of Sehima Heteropogon grasslands to 7.9 t/ha compared to 3.97 t/ha as control (Rai et al 1973). The application of the same dose in Crysopogon fulvus increased about 95% forage yield (Kanodia). For acidic soils addition of 3-5 t/ha of lime is recommended by Gupta (1980).

**(vii) Introduction of top feed:** - In low rainfall areas livestock depends upon crop residues, stored grasses, fodder and top feed of trees and shrubs for over 6 months. The leaf fodder remains only alternate under famine conditions. Growing of fodder trees in association with grasses and legumes on such grazing lands becomes imperative. Leaves of fodder trees contain crude protein from 12% to 24% on dry matter bases (Bihari and Prasad 1966). A moderate sized Prosopis Cineraria tree yields about 15 kg of dry leaf fodder and one ha Zyzyphus Nummularia shrub yields about 125 kg of dry top feed per season (CAZRI 1976). The tree species for top feed should be such which provide substantial feeds from seeds and pods and should not interfere with the growth of perennial grasses. Important top feed species are Acacias, Albizzias, Bauhinias, Morus, Prosopis, Melias, Zyzyphus, Leucaena, Grevia, Celtis, Populus, Quercus, Robinia, Ulmus, etc. One third of space in a grazing land may be covered by trees and shrubs without detriment to grass cover.

**2.6.23.4. Management of Forest Grazing lands:** - Promiscuous breeding of uneconomic cattle encouraged by free grazing has resulted in the depletion of the forest fringes. The measures to improve the condition of forest grazing lands are: -

**(i) Introduction of rotational grazing:** - Rotational grazing should be planned in the forest grazing lands. It provides time to recoups the vegetation, provides young and nutritious grasses and prolongs grazing season.

**(ii) Encouraging grass cutting:** - It reduces fire hazards and does not have the injurious effect of grazing.

**(iii) Introduction of exotic and indigenous fodder grasses:** - This will solve the problem of poor grass composition and increase the productivity of forest grazing lands.

**(iv) Lopping:** - Continuous lopping make the trees unfit for survival. As a result the area becomes open and devoid of tree growth. While more fodder trees should be planted, attempts should be made to bring lopping on scientific bases. The rotational lopping on a three-year cycle should be chalked out by the Divisional Forest Officer in consultation with people of that area and implemented strictly.

**(v) Sheep and goats:** - Experience advocates the imposition of restrictions on sheep grazing in forest and total exclusion of goats. Damage caused by browsing to young plants is irreparable. Creation of special fodder reserves with the consent of local people of that area under strict rotational control is the only remedy. The rotational grazing should be introduced to regulate the sheep and goat grazing in time and space. Migratory graziers should be discouraged to the extent possible.

**(vi) Grazing policy:** - The existing grazing rules regarding movement and halts of the migratory herds, permissible number of sheep and goats should be strictly enforced through enumeration and registration while issuing the grazing permits. Continuous grazing should be discouraged and rotational grazing should be introduced. Cheap, free and indiscriminate forest grazing must be combated. The existing grazing fee (trini) is very low, in view of sharp rise in the prices of wool, milk meat etc. the upward revision of these rates will serve as disincentive for keeping uneconomical breeds. A programme for rotational grazing should be framed by the Divisional Forest Officer with the consent and consultation of people of that area applying joint forest management approach and should be implemented strictly.

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## CHAPTER VII

### THE WILDLIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE

#### **2.7.1. GENERAL CONSTITUTION AND CHARACTER OF WILDLIFE: -**

This is an overlapping Working Circle and overlaps all the Working circles constituted for the tract. The elevation of the tract varies from 590 meters near Alampur to 5182 meters in Dhauladhars above sea level. Consequently the fauna of the tract has a wide variety of wildlife falling in the categories of Carnivore, Herbivore, Omnivore, Aves and Pisces. However, because of high density of human population, inadequate and broken habitat, excessive grazing, opening up of tract by numerous roads and ruthless poaching, wildlife population has depleted. However, with the enactment and strict enforcement of the complete ban on hunting, some improvement has been noticed especially in case of Leopards and Avian.

The love for wildlife is as old as our civilization. Our sacred scriptures speak eloquently for the protection and preservation of wild animals, birds, and Pisces. The Vedas are full of hymns in veneration of wildlife. Kautilya's Arthshashtra provided for severe punishment for entrapping, killing or molesting deer and birds, pisces in protected areas. Ashoka's fifth pillar edict dating back to 3 B.C. depicts and eulogizes the same theme. Love for wild animals, is engrained in our culture has actually emanated from our conviction that wildlife is important from cultural aesthetic and recreational point of view. There is no denying the fact that the woods devoid of wildlife are soulless and life less entity.

God created all beings with a definite purpose and role in maintaining ecological balance in nature. The wildlife is highly important for maintaining ecological balance in nature. The birds prey on harmful insects and pests. Chakor (Partridge), pheasants, Myna, and several other birds devour about 200 to 300 insects each daily. Besides, the birds help in pollination and dispersal of seeds and fruits. Snakes, jungle cat, and birds of prey like owl, hawk, and help man by checking rodent population, which is highly inimical to agricultural crops. Some animals are used for the preparation of Ayurvedic and Allopathic medicines e.g. Monkeys are used for preparing anti polio vaccine, Musk deer gives scented musk, used in preparation of a variety of Ayurvedic medicines. Likewise snake venom have high medicinal value. Wildlife plays an important role at each trophic level of the food chain in maintaining ecological balance. Top carnivores like Leopards help to check the over population of fox and deers by preying on them. Similarly other carnivores prey on rodents thus checking the over population of these and maintaining the ecological balance.

The scientifically managed wildlife can be a source of sustained revenue by way attracting both domestic and foreign tourists. The importance of wildlife, its preservation and scientific management can hardly be over emphasized.

**2.7.2. BLOCKS AND COMPARTMENTS:** - Each forest will form a compartment and every range will be a block for the purpose of wildlife management.

**2.7.3. SPECIAL OBJECTS OF MANAGEMENT:** - The special objects of management will be: -

- (i) To preserve and protect the natural habitat of wildlife.
- (ii) To protect and preserve various wild animals, birds, reptiles and fishes.
- (iii) To afford all possible protection and the most congenial conditions of food and environment for an unhindered reproduction of all forms of wild animals, birds, reptiles and fishes.
- (iv) To curb poaching of wildlife by organized and un-organized hunters.
- (v) To ensure collection of scientific data for maintenance and development of viable population of fauna for scientific, aesthetic, cultural, ecological and economic purposes.
- (vi) To identify problems of wildlife management and to formulate guidelines for its development consistent with the requirements of forestry and environment.

**2.7.4. MANAGEMENT AND ORGANISATION:** - A separate wildlife wing has been created in the Forest Department Farming, with Pr. Chief Conservator of Forests to head this wing for better and effective management of wildlife. The Palampur Forest Division falls in the Jurisdiction of D.C.F. Hamirpur Wildlife Division.

**2.7.5. MANAGEMENT MEASURES FOR WILDLIFE HABITAT:** - The wildlife management on scientific lines is based on biological characteristics of a species. Social, humanitarian, economic and sentimental considerations are also equally important. Wildlife management must take into account all the considerations. The primary requirement of wildlife is food and shelter. Animals and birds are selective in their food habits. Unless they found suitable conditions for themselves, they will not stay in unfavorable habitats. Favorable conditions need to be created. Forests in turn are benefitted by the wildlife. Some important aspects for improvement of wildlife habitat are suggested as under: -

- (i) Wildlife barriers are to be established at important points on motor roads for curbing the activities of poachers. Field staff needs to be extra vigilant in the remote and interior areas of the division particularly during winter months. During winter wild animals come down in search of food and water when there is snowfall on higher reaches.

- (ii) Grazing in the forest area is to be controlled on rotational basis. The existing number of cattle to be frozen after proper counting and punch marking. No new cattle to be allowed to enter the area. This will gradually reduce the number of cattle. The graziers so affected thus may be suitably rehabilitated on other locations.
- (iii) Protection of wildlife from forest fire should be effectively ensured by creating fire lines, construction of fire watch towers at strategic points and posting of fire watchers during fire season. Field posts should be connected with the control office by wireless / mobile system for providing immediate help to the fire fighting parties.
- (iv) Periodic inoculation of domestic animals of the immediate surrounding areas should be done to prevent cattle borne diseases spreading to the wild animals.
- (v) Adequate food supplies should be ensured. Fruit bearing trees may be planted in the forests augment the existing food supplies.
- (vi) Winter hideouts and shelters are constructed for affording protection to the birds and animals descending to lower areas during winter season.
- (vii) Salt licks and water holes may be provided at suitable places for healthy growth and reproduction of wildlife.
- (viii) Adequate field staff should be provided for enforcing provisions of Wildlife (Protection) act, 1972.
- (ix) Wildlife volunteers may be appointed on part time basis to assist the staff in detection and apprehension of poaching activities.
- (x) Signboards and notices may be put at prominent places containing information regarding prevailing wildlife protection rules and suitable appeal for their observance.
- (xi) List of habitual poachers should be maintained at Range level and their activities kept under observation. In the event of their indulgence in poaching their firearm licenses be got cancelled.
- (xii) Crop protection licenses should be issued only where absolute necessary.
- (xiii) The length of gun barrel sanctioned under crop protection licence should not exceed 45 cm and only a limited quantity of gunpowder / cartridges should be allowed against these licenses.
- (xiv) An education drive for the protection and importance of wild life to the mankind is to be carried out through pamphlets and audio-visual media.
- (xv) Rewards should be offered to those who report and help in apprehending wildlife poachers.

**2.7.6. WATER HOLES:** - Water is the most important factor for the prolific reproduction and healthy growth of wildlife, particularly during summer months when it is scarce. Necessary water bodies need to be provided/ created in areas where it gets scarce in summer by constructing farm ponds, erecting water retention dams in nallahs etc.

**2.7.7. WILDLIFE SANCTUARY:** - **“Dhauladhar Wildlife Sanctuary”** covering complete Uhl range has been declared vide H.P. Government **Notification**

**No. FFE-B-F (6)-9-/99 dated 1.11.1999.** The vegetation in the sanctuary area varies from temperate to sub-alpine and alpine zone, which provides habitat for a variety of birds and animals. On account of the richness and diversity of flora and fauna, the tract was considered of great significance from ecological, faunal, floral, geomorphologic, natural and of zoological point of view, the Himachal Pradesh Government resulted in creation of “Dhauladhar Wildlife Sanctuary”. This is an ideal sanctuary to study temperate and alpine / sub-alpine flora and fauna. This sanctuary is known for animals like Snow Leopard, Leopard cat, Black Bear, Brown Bear, Musk Deer, Ghorals, Martens, Ibex, Common Mongoose and birds like Monal, Koklas, Kaleej, Chakor and Partridges etc. With the creation of Dhauladhar Wildlife sanctuary an effective check on poaching attributable to granting of many crop protection firearms, effective management of wildlife and other developmental aspects of wildlife management like promotion of wildlife tourism will be better served. “**Dhauladhar Nature Park**” has also been created at Gopalpur in Palampur Range. This park is an added attraction to the tourists as well as helping in educating the common people about the ecological importance of wildlife to the mankind. For effective and better / exclusive management of Dhauladhar Wildlife Sanctuary and Dhauladhar Nature Park has been transferred to **Wildlife Wing** of the Forest Department. Forest wise details of sanctuary area carved out from the present Palampur Forest division is appended as Appendix – XVII (Volume – II).

**2.7.8. HUNTING AND SHOOTING:** - The Wildlife (Protection) Act, 1972 and the rules under section 64 of the Wildlife (Protection) Act, 1972, notified vide by H.P. Government **Notification No. 6-9/73-SF dated 24.2.1975** are in force in the state with an object of preserving, protecting and reproducing the fast dwindling wildlife. The Government clamped a complete ban on shooting; hunting etc. of wildlife initially under **Notification No. 6-2/73-SG-III dated 4.5.1982** up to 1987; which has been extended up to 1992-93.

However vide **Notification No.6-2/73-SF/iv dated 21.6.1984**, and **Letter No.FFE-B-F(1)-2/2001 Dated 27.1.2010**, the Govt. has allowed hunting of the under mentioned crop damaging wildlife, as per procedure laid down:

1. Wild boar.
2. Porcupine.
3. Sambhar.
4. Cheetal.
5. Hare.
6. Jackal.
7. Monkey.
8. Black bear.
9. Parrot.
10. Blue Bull (Neelgai).

**2.7.9. LEOPARD MENACE:** - The above stated measures have lead to the disturbance in the food chain to cause increase in carnivorous wildlife like Leopard considerably, which in turn is killing domestic animals. The Govt. is, therefore,

paying compensation to the owners of the domestic animals killed, and for human beings injured or killed by wild animals as per Notification **Notification No. Fts. (F)-6-7/82 loose dated 9.4.1996**. Leopard sometimes turns man-eater or cattle lifters. This is due to the depletion of viable habitat, disturbance in food chain and loss of cover for these man-eaters. To check the menace of man-eater / cattle lifter leopards, followings measures are suggested: -

1. At the very initial stage it should be declared as man-eater as per procedure laid down.
2. Traps are to be laid around and near the affected area to trap and translocate the man-eaters to nearby zoo.
3. To make wide publicity in and around the affected localities about the attacking habits of man-eater.
4. It is suggested that professional hunters should be contacted for the killing of declared man-eater.

**2.7.10. MONKEY, WILD BOAR ETC. MENACE:** - Monkeys, wild boars and birds cause considerable damage to agricultural crops. Eradication of said animals is permitted vide **letter 6-2/73-SF/IV dated 21.6.1994**. However following measures are suggested to control the population of damage causing animals: -

1. **Direct Method:** - This involves lethal methods like shooting, poisoning and biological control through predators.
2. **Physiological Control:** - This method involves modification of an animal's physiological ability to reproduce. The tested chemical sterilants can be used to cause temporary or permanent sterility in monkey and wild boars.
3. **Capturing and Sterilization:** - It is one of the methods to control population in an area where there is abundance of monkeys. This method involves capturing of monkeys in and around the affected locality and transportation to nearest "Monkey Sterilization Centre". This is an expensive method and can be very effective in monkey affected localities.

The combination of above methods can minimize the problems to some extent in the affected areas. However, some other suggested measures for the reduction in the conflict between man and animals are as under:

#### **PROACTIVE:**

(i) The villagers are already using deterrents such as making sounds at night, beating drums, lighting a fire, or putting up a scarecrow in their fields. The alternative access to crop fields can be of some use.

(ii)The Forest Officials need to take some proactive measures such as proper identification of the rogue animals, their tracking, and if needed “culling” or elimination.

(iii)Feasibility of setting up of cages/radio collaring of the problem animals may be explored. The Forest Officials and the local villagers need to put up a combined defense against such animals.

(iv)There is a need of regular census of ungulates and carnivores in the forests. The prey-predator relationship needs to be studied and worked out for the mountain animals along with the carrying capacity of their habitats.

(v)The issue of crop insurance has a lot of promise to resolve the man-animal conflict in the Palampur Forest Division. Possibility of paying a portion of the insurance premium by the Forests Officials for poor villagers should be explored but proper checks and balances are to be devised for such insurance.

#### **REACTIVE:**

However, once the damage is done, the provisions of compensation should be an easy and straightforward process so that the poor villagers are able to receive the compensation easily and without delay. It is also important that the forest department functionaries ensure that the poor people not only attend Panchayat or Gram Sabha meetings in good number but also participate actively so that their voice is heard. Proper checks and balances can be evolved. The removal of problem animals may be considered in case such animals have been properly identified. In fact, the main solutions lie in awareness about the large-bodied animals, their ecology and behaviour; at the same time recognition of the fact that these are the poor villagers showing tolerance to the existence to the crop damaging bear or livestock lifting Leopard. This enhances the limits of human existence with the large carnivores. The future of man-animal conflict resolution lies as much in the involvement of the local communities in the wildlife habitat management, as in the measure that are taken to leave the wild habitats to the wild herbivores.

**2.7.11. COMPENSATION ON ACCOUNT OF DAMAGE DONE BY THE WILD ANIMALS:** - The H.P. Govt. vides **Notification No. Fts. (F)-6-7/82 loose dated 9.4.1996** have declared the categories of loss done by wild animals and prescribed the rates of compensation thereof as relief. The detail of loss caused to domestic cattle, human beings and compensation paid on account of such losses for the period 1990 -91 to 2009-10 is tabulated in Table 2.7.2.

**Table: 2.7.2.Compensation paid on account of loss by wild animals.**

Year.	No. of cases sanctioned.	Human beings.		Animals killed.		
		Killed	Injured	Cow	Ox	Calf
1	2	3	4	5	6	7
1990-91	300	1	6	85	42	4
1991-92	271	-	14	85	70	9
1992-93	91	-	-	26	10	2
1993-94	519	-	5	188	97	4



1994-95	205	-	10	83	38	6
1995-96	243	-	5	69	63	4
1996-97	109	1	5	39	22	-
1997-98	79	-	7	37	13	-
1998-99	72	1	8	20	20	-
1999-00	54	-	6	15	12	-
2000-01	54	-	2	27	7	2
2001-02	45	-	2	15	15	-
2002-03	22	-	5	8	2	-
2003-04	19	-	5	7	1	-
2004-05	20	-	11	4	1	1
2005-06	23	-	10	5	-	-
2006-07	11	-	8	-	1	-
2007-08	38	-	29	3	-	-
2008-09	50	-	43	4	-	-
2009-10	98	-	93	3	-	-

Buffaloes	Pigs	Mules/ horses/Asses/Mare.	Sheep	Goat	Ram	Amount Sanctioned.
8	9	10	11	12	13	14
8	3	22	114	87	27	2,18,300/-
16	-	18	100	39	3	2,11,650/-
-	-	7	36	31	-	47,400/-
6	2	17	102	95	3	4,00,850/-
10	2	12	38	39	-	2,10,460/-
3	-	14	62	67	-	2,70,260/-
3	-	9	47	27	-	1,37,159/-
-	-	3	8	31	2	94,263/-
2	-	7	4	49	-	1,18,208/-
-	7	6	57	28	-	75,817/-
-	4	5	14	23	-	66,630/-
-	-	4	-	12	-	65,630/-
-	-	2	25	15	-	39,297/-
-	-	1	5	10	-	28,625/-
-	-	1	2	2	-	33,450/-
-	-	8	2	5	-	40,376/-
-	-	1	-	5	-	2,74,500/-
1	-	2	19	6	-	2,61,134/-
-	-	1	-	1	-	5,84,875/-

The degree of compensation paid is going to increase over the next few years with the increase in population of cattle, human beings as well as wild animals.

**2.7.12. WILDLIFE CENSUS:** - The wildlife census has been carried out during 2004 by the territorial staff of Palampur Forest Division. Results are reproduced as under in Table 2.7.3.

**Table: 2.7.3. Rangewise figures of Wildlife Census (2004)**

<b>Name of wild animal.</b>	<b>Bajnath.</b>	<b>Droh.</b>	<b>Palampur.</b>	<b>Total.</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Leopard.	7	6	17	31
<b>Pheasants:-</b>				
Kalij.	753	221	79	1053
Koklas.	-	-	4	4
Himalayan Monal.	21	-	41	62
Red Jungle fowl.	510	663	109	1282
Indian Pea fowl.	116	153	69	338
Monkeys.	5591	4807	3887	14285
Langurs.	518	135	-	653

Source: - Palampur Forest Division.

**2.7.13. SURVEY AND DATA COLLECTION:** - To identify the various parameters to base future management, the survey and data collection on following lines are prescribed to be carried out by the Wildlife Division.

**(i) Predators:** - The existing number of each predator species along with their prey population should be assessed. Damage cases of domestic animals and injuries to human should be listed. Prey-predator ratio of these animals should be assessed periodically. All the necessary steps should be taken to keep this ratio to the optimum level.

**(ii) Migration:** - Most of the animals and birds move to lower elevation in winter. Seasonal migrations and movement of such animals and birds should be studied and record maintained.

**(iii) Breeding:** - Breeding seasons of animals and birds should be studied. Hatching period of pheasants should be observed and record maintained.

**2.7.14. SCIENTIFIC STUDY AND RESEARCH:** - Studies and research on the wildlife population needs to be studied and applied in the wildlife management. Population has to be studied on the basis of the peculiar habits of animals and the birds and extent of habitat available for that particular animals / birds. Priority should be given to habitat. Latest sampling techniques should be applied in consultation with **Wildlife Institute of India** Dehradun to assess the nature of habitat and population of wild animals / birds. For pheasants particular time of calling and breeding should be studied and data maintained. Similarly for animal population scientific study of their habitat can also be computed. The study on occurrence of diseases in wild animals and birds population should also be made scientifically and sampling methods. This will help in planning the future management of wildlife in more scientific and environment friendly way.

### **2.7.15. FIELD CRAFT - HOW TO OBSERVE AND UNDERSTAND THE JUNGLE:** *(Adopted from an account by Dr. AJT Johnsingh of WII)*

When guards/officers/others venture into the forest they should be equipped with certain indispensable articles: a small sharp knife, a compass, a lighter or a match-box (covered in a water-proof polythene bag), leech-proof socks (if it is a leech country), a small rope, rain-coat (if it is in the rainy season or in an area of high rainfall), a good pair of field shoes and field dress (olive green or khaki), which will merge with the background.

Animals such as Himalayan Black Bear, Brown Bear and Leopard can move much faster than humans. At the first close encounter they may snort, roar or scream. These sounds when heard in the setting of the jungle can frighten us terribly and only experienced lucky persons who have survived these encounters will be able to tell us how weak and wobbly their knees became after the first nerve-racking encounter. We should not think that we can easily outrun and escape these animals which, as said earlier, are much faster than we are. Also the terrain on which we will have to run- with slope, many holes, sharp wooden stumps, tangle of creepers, dense tall grass, logs, and rocks- is not an ideal place to outrun these beasts which run with four legs while we have only two teetering legs.

Therefore, go with caution in a forest where there are dangerous animals. Please follow the dictum "I should see these animals before they see me and should hear them before they hear me". Do not talk unnecessarily. Human voice can be heard, even from a long distance, by the jungle animals, in the "silence" of the forest. If there is a need to communicate, better whisper and signal. The objective of our visit to the forest is to see as many animals as possible and observe them. This can be accomplished only when we move as quietly as possible. We spend a fraction of our life looking for and observing animals in the forests. During this brief period, we should be as quiet as possible and observant of the events that happen around us. **Silence is an essential part of jungle-craft.**

In the jungle, smokers should become non-smokers. This is necessary for several reasons: by not smoking (i) the animals will not be alerted by the smell of the smoke, (ii) we avoid setting fire to the jungle, (iii) we show the utmost reverence to the jungle which we have resolutely determined to conserve. When we walk along a forest trail, particularly when the wind carries our smell down the trail, we should proceed with utmost caution. This is because animals like bear (particularly those which have had encounters with people earlier and therefore are not shy of people) can smell your approach and then either slink away or wait for your arrival. When the wind carries your smell down the path, walk slowly and silently, stop for a few seconds every 50-100 m, listen for sounds and then proceed. Most animals like bear make some sound and indicate their presence. All these can be heard if you walk silently.

## FOREST RULES

(i) Never approach dangerous animals like black bear (particularly with the cubs) very close when they are in a flat terrain. With caution it is possible to approach them in a hilly or rocky terrain where the chances of escaping these animals are much greater.

(ii) If there is a fresh blood trail on the path one should proceed carefully. A wounded animal (e.g. a bear wounded by a poacher) may be ahead of us and should turn aggressive if approached very close. The same is applicable to other potentially dangerous animals like the leopard.

(iii) A leopard carrying its fresh kill may cause the fresh blood trail. Approaching a leopard on its fresh kill could be dangerous.

(iv) While on a blood trail if there are alarm calls of monkeys, and birds ahead of us it could be an indication of the predator going ahead. Go with caution.

(v) If you are returning to your camp alone on foot late in the evening and if you see a dangerous animal (e.g. a bear with cubs), stop immediately. Stay at a safe distance. Hide behind a tree or rock, observe the animal and then by talking, by tapping on the tree with a stone or wood, or even by allowing the wind to carry your smell let the animal know that a human being is somewhere in the vicinity. The presence of the unseen human being makes most animals nervous and they make a slow but steady retreat away from your direction. Who will enter in to a patch of tall dense grass where you hear the hissing of a cobra but don't see the snake? We will move away from the area. The great naturalist Dr. George B. Schaller has successfully used the above technique of remaining unseen and scaring away the Himalayan black bears in Dachigam National Park, Kashmir, India.

(vi) Do not stumble through the forest without carefully looking at the path.

(vi) Climbing a steep hill slope by clinging on to trees, climbers and rocks. Particularly in a tropical habitat, needs to be done with great caution. Before placing the palms, which like the feet are not protected, to hold on to something, watch carefully. There could be a scorpion, a nettle plant or a wasp nest nearby.

(vii) People often fail to differentiate between chasing and charging by a bear. Charging may stop with a forward aggressive rush for 20-50 m but chasing can go much beyond that even for a few hundred meters which could be very dangerous. When chased by an animal throw a conspicuous object (e.g. a white hand-kerchief) on a bush and run down a slope or run zig-zagging among the bushes. Put up as much distance as possible between you and animal. While chased, do not crouch inside a bush hopping to hide.

(viii) When chased by an animal, never try to climb a tree. A jungle- living tribal can do that but not a guard if he is recruited from a town or a Manager who is not used to tree-climbing. The fear would drain all the energy needed to climb.

(ix) Sometimes you will be forced to walk through the forest at night. If you are in a group, stay together. As you walk along make some noise (talk, sing, or tap on a tree or rock at regular intervals). Don't surprise animals by walking in to them. Tap the ground periodically, as you walk along, either with your foot or a stick. The vibrations will keep the snakes away and most animals will also move away when they are warned from a distance.

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## **CHAPTER-VIII**

### **THE JOINT FOREST MANAGEMENT (OVERLAPPING WORKING CIRCLE)**

#### **2.8.1 GENERAL:**

This working circle will be overlapping working circle and includes both degraded forests as well as good forests, which needs immediate treatment through protection, afforestation, pasture development, soil and water conservation etc. Treatment plan and memorandum of understanding will be different for degraded and good forests. As in other parts of Himachal Pradesh, most of the rural populace in Palampur Forest Division uses significant quantities of forest goods and benefits from the services provided by the forest areas. There is lot of pressure on the forests, apart from the usual demand for fuel, fodder and timber. The other rights enjoyed by the right holders as per the provisions of the Settlements, also are a major stake in the forests besides the livelihood issues.

#### **2.8.2. THE NEED FOR JOINT FOREST MANAGEMENT:**

To address the long standing problems of deforestation and land degradation, the approach of involving local communities in an effective and meaningful manner, is gaining acceptance significantly. Even the present National Forest Policy, 1988 emphasises on participatory management and common property management. It also specifically mentions that to achieve the objectives of the Policy, a massive people's movement should be created, especially involving women. Consistent with the NFP of 1988, the Government of India, on 1st June 1990, issued policy instruction to all state governments supporting greater participation of village communities and NGOs in regeneration, management and protection of the forests. In keeping with the above notification, the Government of Himachal Pradesh has formulated a policy vide No. Forest (c) 3-4/80-V dated 12-05-1993, supporting Joint management arrangements. Ever since village communities are being involved by the Forest department to further the aim of protection and management of forests and continuation of forest cover. The recognition of the link between socio-economic incentives and forest development has been singularly responsible in eliciting community participation. A new resolution of the Ministry of Environment and Forests dated February 21, 2000 has further strengthened the JFM programme and this circular interalia contemplates:

- (a.) Legal back up to the JFM committees;
- (b.) 50% members of the General Body should be women;
- (c.) Extension of JFM in good forests areas, with sharper focus on activities concentrating on NTFP/NWFP management.

This resolution is an attempt to evolve a proactive and people friendly framework for meaningful implementation of the programme, though the detailed operational modalities to translate these concerns have not been spelt out.

There are various schemes and projects, initiated by the H.P. government and some financed through External agencies e.g. externally aided projects that lay emphasis on people's involvement in forestry. The Sanjhi Van Yojana is a H.P. government and Forest Development Agency Palampur Government of India backed initiatives. Recently the Government of Himachal Pradesh has issued a notification no. Fts-II (B)15-10/87 dated 23rd August 2001, called the Himachal Pradesh Participatory Forest Management Regulations, 2001. These rules shall be applicable to such government forests and lands, including common lands, where participatory management is envisaged.

### **2.8.3. JOINT FOREST MANAGEMENT IN HIMACHAL PRADESH:**

In 1985, social forestry was given impetus by the National Social Forestry (Umbrella) Project. The project achieved its objective of planting, but physical targets took precedence over participatory objectives, and social and equity issues could not be addressed. In the 1980s the World Bank-supported Social Forestry project (1984-92) and the Indo-German Integrated Dhauladhar Project (1982-92) were taken up in HP. Both were more participatory than previous Forest Department Projects. A new scheme "Van Lagao, Rozi Kamao" was launched in 1992 in which plantation over 2 ha land was awarded to a person belonging to Antodaya category and in lieu of protection and care of this area, the beneficiary was to be given remuneration depending upon the survival percentage of the plantation. In the 1990s both switched their focus to the Shivalik hills with the Indo-German Changer Project that went on till 2005-06, as did the World Bank IWDP Kandi Project.

The framework for JFM in HP is provided by the Government of HP Order of 12 May 1993, which followed the June 1990 Government of India (JFM) Circular enabling the spread of JFM. The HP Order was compiled following study of JFM resolutions issued by other states. The JFM Order coincided with the development of a donor-led (DFID) project for Mandi and Kullu districts, in which JFM was a key element. This Himachal Pradesh Forestry Project (HPFP) may be seen to have facilitated the introduction of JFM statewide. Donor support to Mandi and Kullu districts continued until March 2001.

Until 1998, JFM in HP was confined to donor-supported pilot activities (DFID, GTZ, World Bank). The participation was the buzzword from Delhi, a group of three or four FD staff were tasked with developing plans for the new scheme. The Chief Minister was persuaded to launch *Sanjhi Van Yojna* (SVY). 'Entry point activities' – such as making pots, water taps, mending temples, small infrastructure developments; all designed to attract people to the project – were given a budget so that DFOs could be seen to be dispensing something worthwhile. To support the state JFM Order, Participatory Forest Management (PFM) Rules were developed for HP, and notified on 23 August 2001. These Rules make provision for increasing the institutional autonomy of Village Forest Development Committees (VFDCs) by registering them as Village Forest Development Societies

(VFDSs) under the Societies Registration Act. Importantly, the PFM Rules encourage VFDS formation panchayat wardwise thereby attempting to link these bodies directly with the panchayat structure with each elected panch being on the executive committee of the VFDS, *ex officio*. However, the role of the VFDSs continues to be viewed narrowly, focusing mainly on helping the HPFD to police forests and on wage-based micro-plan activities. This resulted in the 'New SVY' rules and guidelines being announced by the GoHP in August 2001. They contain provisions for VFDSs to become, in legal terms 'the forest officer' (not notified as on July 2011) for levying fines etc, and for 100 per cent share in intermediate usufructs while on final harvest 75 per cent would go to the VFDS and 25 per cent to the panchayat. The GoHP agreed to completely forgo any share from JFM areas. Under 'New SVY': entry point activities are abandoned but "income-generating activities" introduced; forest guards will not be the member secretary of the Executive Committee; but local organisers – usually led by a literate woman linked to a local community-based organisation, helps mobilise towards a properly representative VFDS based on a panchayat ward. Several meetings are held before a microplan is initiated – this shows VFDS maturity. The FD sends a cheque to a local bank account. The VFDS agrees with the FD to furnish a 'utilisation certificate' which can be monitored and checked.

At the policy level the PFM Rules and SVY Rules and Guidelines of August 2001 are seen as a major step forward, laying the basis for uniformity in approach to community based forest management. It also makes JFM poverty focussed and is targeted to the resource dependent.

In 2003, MoEF started the Forest Development Agencies (FDAs) at district level – with DFOs getting direct access to central funding – for forest and plantation work for employment generation objectives. This is an 100 per cent central sector scheme, created to reduce the multiplicity of schemes with similar objectives (it merges four existing central schemes), ensure uniformity in funding pattern and implementation mechanism, avoid delays in availability of funds to the field level and institutionalize peoples' participation in project formulation and implementation. FDAs will be constituted at the territorial/ wildlife forest division level, and JFM committees will be the implementing agencies at grassroots level. FDAs are to work through forest guards / deputy rangers- and thus appear to conflict with SVY rules which allow for the member secretary to be elected by the JFMC / VFDS. The growth of FDAs and therefore of JFMCs since 2003 appears to be fluctuating as figures culled out from various departmental reports indicate. In March, 2003, 678 JFMCs were reported covering a forest area of about 1640 km<sup>2</sup> distributed in RFs, DPFs & UPFs. In March, 2005, 1690 JFMCs are reported covering a forest area of over 4200 km<sup>2</sup>. As of December, 2008, 1381 JFMCs stand listed. However, as per field reports only 986 of these are said to be active. In March, 2010, a total of 1109 JFMCs have been reported covering again an area of about 4200 km<sup>2</sup>.



#### **2.8.4. SPECIAL OBJECTS OF MANAGEMENT:**

(i) To inculcate in the people or right-holders a direct interest in forests development, conservation, protection and to make them aware of the values of the forests to the mankind.

(ii) To involve people / communities in the treatment of degraded forests through protection planning, afforestation, pasture development, soil and water conservation so as to arrest their further degradation and for sharing of usufructs.

To achieve these objectives it is suggested that all activities, as far as possible, should be carried out after involving local people. However, the general prescriptions of the working plan be adhered to. It is also suggested that species of local importance be preferred in afforestation activities. Such species should have economic value and should be fast growing, high yielding and of multiple use. Species that provide raw material for local industry, craftsmanship should be encouraged. Quick growing and high yielding grasses and legumes e.g. Hybrid Napier, provide immediate alternatives to fodder demand and should be introduced along with tree species to sustain people's interest in the closed areas. Bamboos should be planted in gullies, nalas and moist pockets as these would serve the dual purpose of soil conservation and fuel and fodder replenishment as these are relatively quick growing. An all out effort should be made to evolve a "Community-State Partnership".

#### **2.8.5. STEPS INVOLVED IN JOINT FOREST MANAGEMENT:**

Community participation is an important aspect of any joint management plan. The process of community involvement starts from identification of the village to problem analysis and in monitoring and evaluation of the programme. The sustainability of any such practice or activity depends on the level of participation. Participation fosters ownership of the people over the resources being managed by such joint activity and ensures better results.

Participatory planning helps in

- building the "we" feeling;
- involve and ensure the community's participation
- transparency
- brings clarity; and
- sustainability

#### **2.8.6. APPROACH TO BE ADOPTED IN IMPLEMENTING JFM SCHEMES:**

- Educate people on the aim and objectives of the programme/scheme before launching the programme/ scheme;
- Make extensive and intensive use of PRA techniques to formulate the plan and share the derived information with the people;

- Draw up a working scheme/ Microplan with the active involvement of the local people, ensuring representation of the heterogeneity of the group;
- Execute works and use PRA techniques for monitoring as well;
- Exemplify spirit of participation by well defined, lucid usufruct sharing mechanisms and transparency in accounting the expenditure on the works.

#### **2.8.7. PAST EXPERIENCES/LESSONS LEARNT IN PARTICIPATORY APPROACHES:**

The last three decades of dabbling with JFM / PFM under various EAPs and the homegrown SVY and now the Centrally administered FDA do hold some valuable lessons and insights for the future of participatory natural resource management in the state.

1. PFM should focus in and around pockets of poverty i.e. remote, forested areas (better forests) and where livelihood dependence on forests is high. This would entail several genuine joint management activities (other than plantation) like collective protection against illicit felling, fires, poaching and so forth. Issues of Rights, equity and benefit sharing are better addressed and conflicts resolved.
2. In participatory approaches, the **process** is more important than achieving targets. Choosing and regularly training the right persons for the job is therefore critical.
3. Sharing of removals, including resin, intermediate and salvage felling with VFDSs are necessary to establish long term stake of local communities in PFM.
4. Continual Policy and Rules adjustment and calibration to promote better market returns for wood and non-wood based enterprises. Example, the recent decontrol of bamboo trade and transit. Next: efficient markets for value added products.
5. Local Leadership – this is a critical role. Successful examples of JFM or CFM show that local leadership roles have been crucial in making the change. It could be an enlightened, accepted local person, an elected representative, a dedicated NGO/ CBO or even a committed forest officer. This is also important for sustainability of groups.

##### **2.8.7.1. SANJHI VAN YOJANA:**

Sanjhi Van Yojana, a community based afforestation scheme has been launched in Himachal Pradesh on 25<sup>th</sup> December 1998. Under this scheme the communities as well as the NGOs are to be involved in the protection of the existing forest wealth as also to participate in holistic rural development. The main objectives of this scheme are -

- (a.) Involvement of grass-root level institutions e.g. gram panchayats, mahila mandals, yuvak mandals, schools, VFDCs, NGOs etc. in eco-restoration.
  - (b.) Regeneration of degraded forest areas through community involvement.
  - (c.) Creation of social assets for the benefit of the communities.
  - (d.) Increasing the productivity of the forest areas by improvement of nursery stock through adoption of modern nursery techniques.
  - (e.) Re-orientation of forest staff for facilitating community participation.
  - (f.) Generation of employment opportunities in rural areas. (g.)
- To bring more area under tree cover by encouraging rehabilitation/ plantations of private wastelands on cost/ benefit sharing basis.

No specific duration for the scheme has been proposed and depending upon its success in the initial years, the scheme would be adopted as a model for natural resource management by the State Forest Department.

In order to execute the scheme, a Village Forest Development Society (VFDS) is to be constituted in the villages situated on the periphery of the forests. The VFDS will be a registered, non-political body representing almost all families of the village, migratory graziers, Antodaya/ IRDP and other landless families who are dependent on forests for their livelihood. The society will be registered by the DFO(T) under the Societies Act and the process of formation of VFDS will be assisted by the DFO or his representative, not below the rank of Range Forest Officer. The executive committee will have 10-15 members and the local Forest guard will be the Member Secretary till such time the VFDS is enabled to handle its own affairs. For this the forest guard will pick up a co-secretary from amongst the literate persons in the village to acquaint him with the process and facilitate taking over soon.

#### **2.8.7.1.1. RESPONSIBILITIES AND DUTIES OF THE VFDS:**

- (a.) Assist the Forest department in planning, protection, afforestation etc. as per the approved Microplan;
- (b.) Judicious use of all existing rights and their equitable distribution;
- (c.) Inform the department about forest offenders;
- (d.) Help the Forest department in extinguishing forest fires;
- (e.) Persuade villagers to give available area for plantations
- (f.) Fair and just distribution of usufructs;
- (g.) Settlement of disputes between VFDS members;
- (h.) Protect the assets created by the VFDS;
- (i.) Honour all the commitments made with the department and the members of the VFDS.

#### **2.8.7.1.2. RESPONSIBILITIES AND DUTIES OF THE FOREST DEPARTMENT:**

- (a.) To recognise the VFDS and give full weightage to its recommendations;
- (b.) To explain the contents of the Microplan to the VFDS members;
- (c.) To provide technical know-how to the Executive body to carry out its responsibilities.
- (d.) To honour the commitments made with the VFDS.

The areas taken up under the SVY scheme would primarily be degraded forests, government lands, existing poorly stocked plantation. These would be notified under Section 38 of the IFA. The area should not overlap with any other scheme and those with minimal conflicts would be given priority. The microplan would cover a period of 5-7 years and would contain 60% of the total activities for afforestation component and NTFPs. To ensure participation through creation of stakes of the communities to encourage their owning up the assets created by them, the VFDS will contribute 1% of the total cost of the microplan in cash and 4% as “shramdaan” (Voluntary labour) for the various works to be executed under the microplan.

**2.8.7.1.3. PROGRESS OF WORKS UNDER JOINT FOREST MANAGEMENT SCHEMES:** The works executed under different schemes in Joint Forest Management are as follow:

**2.8.7.1.3.1. SANJHI VAN YOJANA:** - The VFDS wise area tackled in Palampur Forest Division as it stood on 31.3.2010 under Sanjhi Van Yojan is given in Table 2.8.1.

**Table: 2.8.1. Areas Tackled under Sanjhi Van Yojana (ha)**

<b>Sr. No.</b>	<b>Name of VFDS</b>	<b>Area Planted in ha.</b>
<b>1</b>	<b>2</b>	<b>3</b>
1.	Nee	9.00
2.	Heb	10.00
3.	Sedoon	25.00
4.	Thaliyal	23.50
5.	Tanda	23.50
6.	Jhikli-Bheth	30.00
7.	Bir Chogan	33.50
8.	Gunehar	30.00
9.	Rakh	40.00
10.	Suru	28.00
11.	Gharas	35.00
12.	Rulling	25.00
13.	Bharag	20.00
	<b>Total</b>	<b>309.00</b>

Source: Palampur Forest Division.

All the ranges were involved in the scheme. It is observed that activities pertaining to afforestation, soil conservation, assisted Natural regeneration along with some entry point activities (EPAs) are being carried out after formulation of a microplan which is prepared using participatory methodologies. The entry point activities generally include construction or repair of village paths, construction of small rooms in Panchayat buildings and school buildings, augmentation of drinking water supply and irrigation channel etc. Under the soil conservation component checkdams and spurs are being constructed.

So far 309.00 ha area has been treated under the afforestation and Assisted Natural Regeneration components by the thirteen village forestdevelopment societies. In a modification of the scheme, now named as the “Parishkrit Sanjhi Van Yojana” scheme, notified vide No. FFE-C (9). 1/2001 dated 23<sup>rd</sup> August 2001, and the existing Sanjhi Van Yojana Scheme 1998, the Parishram Hamara, Van Hamara Scheme, 2000 and the Apna Van, Apna Dhan Scheme, which was proposed to be launched during 2001 were clubbed together to constitute the Sanjhi Van Yojana Scheme, 2001. This scheme is governed by the Participatory Forest Management Rules, 2001.

The following salient modifications have been made in the new scheme:

(a.) Each VFDS shall be required to make cash contribution of 15% of the annual outlay under the approved micro-plan.

(b.) In order to enhance the economic stake of the rural communities, forest related income generation activities shall be promoted under this scheme, which shall commence only in the second or third year of the micro-plan.

(c.) Inputs sharing arrangement has been made especially to promote social fencing, wherein the funds normally spent on fencing will be made over to the VFDS, who would be at liberty to decide how to use these funds for the protection of the plantation. Table 2.8.2 tabulates the differences between the original and modified Sanjhi Van Yojana schemes.

**Table 2.8.2. Differences between SVY I and SVY II**

<b>S. No</b>		<b>SVY-I</b>	<b>SVY-II</b>
1.	MOU and rules	There was no such special provision	Forest department shall frame these rules in consonance with the PFM rules
2.	Choice of Member Secretary	Forest guard will be the member secretary	Any literate person chosen by the General House can become the member secretary. He will later on be trained by the forest department.
3.	Size of the VFDC	No limit prescribed	About 100 families to constitute one VFDC
4.	Membership of the VFDC	Only one male and one female member of the family are members	All adults in a family can be members, but atleast one male and one female member should be represented.

5.	Quorum	Only for approval of microplan, 50% of the members are required to be present.	For the General House presence of 60% members, half of which should be women, is essential. The Quorum for the executive committee is 70%, of which half should be women.
6.	Organisation of Meetings	The General House Meeting is to convened at least once every year.	The general House is to meet at least twice per year while the Executive has to meet once every three months.
7.	Term of the Executive Committee	One year	Two years, after which the General house shall again elect the executive. Each Executive member shall serve for a maximum of two terms only.
8.	Cost sharing mechanism in microplan	4% as labour 1% in cash	At least 15% in cash which will have to be deposited before release of Grant in aid. In afforestation works this contribution can also be in the form of labour.
9.	Activities at the Entry Point	25% funds of the microplan can be utilised for non-forestry activities	25% of the microplan's funds would be spent on Income generation activities and on forest and soil protection works, in consultation with the VFDC.
10.	Usufruct Sharing	<p>a. VFDC members can collect fallen twigs, grass, fruits, flowers, seed and naturally growing NTFPs.</p> <p>b. 50% of the income from plantation areas raised by the VFDC will be deposited in the government treasury.</p> <p>c. On maturity of these plantations, 25% of the harvest value shall be given to the Executive of the VDC for distribution among members; 25% will be deposited in the VDC membership fund for development works in the area; 10% of the remaining half shall go to the concerned Panchayat and 40% to the government exchequer.</p>	<p>a. All products, including NTFPs from the Project area and all benefits from the plantation areas shall accrue to the VFDC.</p> <p>b. On maturity 75% of the harvest value shall go to the VFDC and 25% to the concerned Panchayat. It is mandatory to utilise 40% of this money for forest development and soil conservation.</p>

**2.8.7.1.3.2. FOREST DEVELOPMENT AGENCY:** - The JFMC wise area tackled in Palampur Forest Division as it stood on 31.3.2010 under FDA is given in Table 2.8.3.

**Table: 2.8.3. Areas Tackled under Sanjhi Van Yojana (ha)**

Sr.No.	Name of JFMC	Area tackled		Total
		Natural regeneration	Management intervention	
1	Brahan	0	20	20
2	Kand-Kosri	0	20	20
3	Karnarthu	0	20	20
4	Sarahjda	0	20	20
5	Nain (Uttrala)	0	20	20
6	Bhatubhang	5	5	10
7	Ghamrotha	0	5	5
8	Lambaput	2	3	5
9	Kuddan	0	60	60
10	Dehal	0	15	15
11	Kandi-Drognu	5	10	15
12	Thalla	6	5	11
13	Kathiana (Uarna)	5	5	10
14	Shahan	20	32	52
15	Bundla-khas	0	5	5
16	Jhanjharda	10	10	20
17	Ghatehar	10	10	20
18	Ghalooni	5	0	5
19	Bhadrol	25	15	40
20	Khatin	25	25	50
21	Tanda-jol	20	15	35
22	Thalial	5	5	10
23	Kolru	5	0	5
24	Kaloona	5	5	10
25	Nanahar	55	130	180
26	Spedu	25	30	55
27	Bhangali	25	25	50
28	Ghanetta	8	4	12
29	Andour	0	10	10
30	Nadli	5	15	20
31	Bhadera	5	5	10
32	Patt-Kawali	20	0	20
33	Dhaniara-Duhak	30	0	30
34	Gadrehar	0	7	7
35	Thural-K-khas	10	10	20
36	Dagera	10	8	18
37	Maila	8	10	18
38	Gadiarpat	0	5	5
39	Kosri-khas	10	10	20
40	Molag	10	10	20
41	Upper-theru	7	0	7
42	Harot	5	5	10
<b>Total</b>		<b>386</b>	<b>614</b>	<b>1000</b>

Source: Palampur Forest Division.

Under FDA Project an area of 1000 ha area has been treated under Assisted Natural Regeneration and Management Intervention components through forty two Joint Forest Management Societies.

**2.8.8. PAYMENT FOR ECOSERVICES:** - According to Wunder (2005), PES can be defined as a voluntary transaction where a well-defined environmental service (ES) (or a land-use likely to secure that service) such as Water is being 'bought' by a (minimum one) ES buyer from a (minimum one) ES provider if and only if the ES provider secures ES provision conditionally. All PES schemes share an objective: providing environmental services that are undersupplied due to the lack of compensatory mechanisms. They provide a mechanism through which services can be provided in a cost efficient manner. PES schemes seek to formulate a certain value to environmental services and establish appropriate pricing, institutional and redistribution systems that will lead to sustainable and socially optimal land use practices. These schemes tend to work best when the value of environmental services is high for beneficiaries and the cost of providing the services is low.

A Pilot Case of Payment (PES) for the Protection of Bohal Spring Water Source of Palampur Town in Palampur Forest Division has been taken up between VFDS Bohal and Palampur town Municipal Committee. The objective of the Palampur Water Governance Initiative (PWGI) is to provide long-term drinking water security (both quality and quantity) to the town of Palampur by Bohal Spring by pilot testing the concept of Payment for Eco System Services (PES) thus demonstrating a robust institutional and financial model for urban-rural engagement on the issue of drinking water security. The process and various steps involved are annexed as Annexure – XXXXXII ((Volume – II).

#### **2.8.9. CONSTRAINTS TO PARTICIPATORY MANAGEMENT:**

There is a general lack of enthusiasm in embracing the idea of shared management in the forestry sector by the people and though some inroads have been made with the communities, a lot more thrust needs to be given to popularise the concept among the masses. The main causes for this lack of encouraging response among people are:

- (a) There is a general apathy of the youth to participatory programmes related to rural sector because with acquiring college education all youth strive for white collared jobs and anything that keeps them back in villages does not enthuse them.
- (b) Lack of proper education of the government programmes and insufficient extension activities of the department.
- (c) Long gestation period of forestry activities.
- (d) Too much dependence of the public on government and subsidy, cost sharing in such activities is generally not accepted.
- (e) Reluctance of government functionaries to hand over control of resources to people or even partially share their “power” with the people.



- (f) Lack of proper legislation on participatory management and usufruct sharing.
- (g) Need to promote income generating activities under JFM programmes.
- (h) Frequent changes in schemes and discontinuation of old schemes which leads to mistrust of people in government.

#### **2.8.10. MONITORING AND EVALUATION:**

The monitoring of the progress and performance of the activities taken under this working circle under different schemes should be done at the Divisional level. Evaluation of the schemes should be planned at an interval of three years involving third party monitoring.

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## CHAPTER- IX

### THE NON-TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

**2.9.1. GENERAL:-** With the thrust of forest management shifting from being 'tree centred' to 'people-centred' forests are now being viewed as a source of not only commercial timber but of valuable Non Timber forest products as well. There is a need to emphasise on the study, exploitation and marketing of valuable medicinal plants found in the division.

This would be an overlapping working circle covering all working circle and is constituted to ensure systematic development and exploitation of non timber forest produce species that occur in the division. The main non timber forest produce found/extracted in the division are Resin, Medicinal plants, and grass. The resin extraction has been dealt under Activities of Forest Development Corporation Ltd. The main emphasis/focus would be on medicinal plants.

**2.9.2. SPECIAL OBJECTS OF MANAGEMENT:-** The State has formulated Himachal Pradesh Forestry Sector Medicinal Plants Policy, 2006 which is aimed at conserving and strengthening medicinal plant resource base in forest areas as well as outside for use towards enhancing health and livelihood security of the people of the State on sustainable basis. The special objects of management would be:-

- (i) To document important NTFP species found in the division.
- (ii) To preserve and improve the quantity and quality of NTFPs in the division and manage them on a sustainable basis.
- (iii) To conserve and augment existing non timber forest produce including medicinal plants resource in its natural habitat.
- (iv) To encourage cultivation of commercially important species of medicinal plants on private lands.
- (v) To develop a system of pricing the wild harvest so as to reflect both the conservation costs and the community benefits.
- (vi) To encourage public-private-community partnership for building capacity for cultivation, value addition and processing of raw material before export from the state.
- (vii) To promote the use of commercially viable medicinal plants by the state owned and private pharmaceutical units and subsidiaries engaged in value addition.
- (viii) To maximize yield of medicinal plants through sustainable natural and artificial regeneration and scientific exploitation.

**2.9.3. BLOCKS AND COMPARTMENTS:** -The entire tract of the division will be covered by taking beat as a unit.

**2.9.4. AREA STATEMENT:** -The working circle is overlapping, no area statement is required.

**2.9.5. ANALYSIS AND VALUATION OF THE CROP:** -The entire tract is rich in many useful trees, shrubs and herbs, which have been exploited from time to time. The list of important medicinal plants / NTFP's found in Palampur forest division as under in Table 2.9.1.

**Table: 2.9.1 Important NTFPs found in Palampur Forest Division:**

Sl No	Common/ Local Name.	Botanical Name	Type	Part used	Uses
1	2	3	4	5	6
1.	Rati	<i>Abrus precatorius</i>	Climber	Seed/ Root	Bruised seeds are poisonous and are used as purgative, aphrodisiac and in nervous disorder.
2.	Khair	<i>Acacia Catechu</i>	Tree	Heart wood	Yield 'Katha' used as astringent, digestive, useful in cough & diarrhea, Externally applied to boils & eruptions on skin.
3.	Babul, Kikar	<i>Acacia nilotica</i>	Tree	Bark	Used for its demulcent effect. An ingredient of bases is used for pastilles & lozenges.
4.	Puthkanda	<i>Achyranthes aspera</i> Linn		Entire plant	Used in cough, & its decoction in given in renal dropsy & bronchial infection.
5.	Bansa, Basuti	<i>Adhatoda vasica</i>	Herb	Leaves, Flowers	Used in treatment of Cough, Asthma & Ophthalmia
6.	Bel	<i>Aegle marmelos</i>	Tree	Fruit	Fruit is chiefly used in chronic diarrhea & dysentery, sweet drinks- 'sharbat' soothing for intestines. Half ripe fruit is stringent, digestive & stomachic. Leaves are useful in diabetics.
7.	Ramban	<i>Agave americana</i>	Shrub	Leaves & Stem	Fibre for rope making
8.	Kikki, Siris	<i>Albizia lebbek</i>	Tree	Root, Bark, Flowers	Uses in hemicrania, cooling, alexiteric, anthelmintic. For asthma & snake bite.
9.	Bhondir, Kurmura	<i>Albizia julibrissin</i>	Tree	Timber	For furniture.
10.	Kali Siris	<i>Albizia Odoratissima</i>	Tree	Timber	Used for wheels, Oil mills & Furniture.
11.	Barbadis akie, Ghikawar	<i>Aloe barbedensis</i>	Shrub	Leaves	Source of resinous drug which is used mainly as purgative
12.	Janmani, Jonkmari	<i>Anagalis arvensis</i>		Entire plant	Cures inflammations, sores, pain in the liver & kidney, ophthalmia, dropsical swelling.

13.	Kateli, Shialkanta, Mexican prickly, poppy	<i>Argemone mexicana</i>		Roots seeds, Juice of plant	Useful in chronic skin disease. Laxative, expectorant & demulcent. For jaundice & cutaneous affections.
14.	Barna, Jhau	<i>Artemisia scoparia waldst. &amp; kit.</i>		Fruits & leaves	Yield acoparone-exhibita hypotensive & tranquilizing activities.
15.	Kakatundi, Kauradoodi	<i>Asclepias Curassavica Linn</i>		Roots/ Juice of leaves	Emetic, purgative, in piles & gonorrhoea. Anthelmintic, sudorific.
16.	Safed musli	<i>Asparagus adscendens Roxb.</i>	Shrub	Root	Used as demulcent and also in diarrhea and dysentery.
17.	Dante	<i>Baliaspermum montanum Muell.</i>	Shrub	Roots/ Seed	Used in dropsy and Jaundice. Oil is used as hydragogue, cathartic.
18.	Tadrelu	<i>Barleria cristata</i>	Shrub	Roots & leaves	Used to reduce swelling, & and infusion is given in coughs.
19.	Kaliar, Lal Kachnar	<i>Bauhinia purpurea Linn.</i>	Tree	Root/ Bark Flowers	Carminative. Acts as astringent in diarrhea. Laxative.
20.	Maljhan, Taur	<i>Bauhinia vahlii</i>	Tree	Seed	Possesses tonic and aphrodisiac properties.
21.	Kachnar	<i>Bauhinia variegata</i>	Tree	Bark	Astringent to bowels, tonic to liver, cures leucoderma, leprosy, asthma, wounds and ulcers.
22.	Kashmal	<i>Berberis lycium</i>	Shrub	Roots	Yield 'Rasaunt' used in treatment of ophthalmia. Also used for piles & as tonic & laxative, in menorrhoea, skin disease & cholera.
23.	Phutium	<i>Bidens pilosa</i>		Flowers	Dried, ground & mixed with alcohol & are used as a mouth wash in toothache.
24.	Bimol, Ciar, Khaksha	<i>Boehmeria platyphylla</i>	Shrub	Bark	For rope making & Textile purposes.
25.	Simal	<i>Bombax ceiba</i>	Tree	Wood/ Root	Wood used for planking, Toys, Well-curbs, Packing cases, Water shoots & Roots of saplings used as a nervine tonic.
26.	Dhak, Palas	<i>Butea monosperma</i>	Tree	Wood/ Bark of roots/ Flower	Wood is used for well- curbs & Piles. The bark of the roots yields coarse brown fibre. Flowers give an Orange dye use to keep out white ants.
27.	Akk	<i>Calotropis procera</i>	Shrub	Root/ Leaves	Roots bark is used in dysentery acts as diaphoretic, expectorant, emetic & is a valuable remedy in skin diseases. Tincture of leaves is useful in intermittent fevers & powdered flowers in cold, cough & Asthma.
28.	Bhang	<i>Cannabis sativa</i>	Shrub	leaves/ flowers	Used as stomachic, antispasmodic, analgesic & sedative.
29.	Amaltas	<i>Cassia fistula</i>	Tree	Pods/ Root bark	Fruit pulp is used as laxative, root bark is used in leprosy.
30.	Kandiari	<i>Caesalpinia sepiaria</i>	Climber	Seeds/ Bark	Medicine & Tanning.

31.	Daia	<i>Callicarpa macrophylla</i>	Shrub	Leaves	Heated & applied to rheumatic joints.
32.	Heart pea, Kanphuti	<i>Cardiaspermum halicacabum</i>		Root Leaves	Considered diaphoretic diuretic, Emmenagogue.
33.	Chilla	<i>Casearia tomentosa</i>	Tree	Wood/ Friut	Wood use for making combs. Fruits used to poison fish.
34.	Chaksu	<i>Cassia absus</i>		Leaves	Bitter, astringent & used as cough remedy.
35.	Chakunda, Kasonda	<i>Cassia occidentalis</i>	Weed	Roots	Useful in ringworm, elephantiasis & scorpion sting.
36.	Panwar, Chakunda	<i>Cassia tora</i>	Weed	Leaves	Used as laxative in form of decoction.
37.	Malkangni	<i>Celastrus paniculata Wild</i>	Climber	Seeds/ leaves	Laxative, stimulant, aphrodisiac & used in leprosy, gout & rheumatism
38.	Somraj	<i>Centratherum anthelminticum</i>	Climber	Seeds	Anthelmintic & are effective against threadworms.
39.	American worm seed	<i>Chenopodium ambrosiodes</i>	Herb	Entire plant	Used as an anthelmintic, effective in expulsion of hookworms.
40.	Mushkapoor	<i>Cinnamomum camphora</i>	Tree	Tree	Yield camphor oil-used in inflammations, rheumatic pains & sprains.
41.	Akanadi, Harjori	<i>Cissampelos pareira</i>	Climber	Roots	Used in diarrhea, dysentery, colic pains, cough & urinary troubles.
42.	Lanjai	<i>Clerodendron inerme(L) Gaertn</i>	Shrub	Leaves & roots	Juice is considered alterative in scrofulous & venereal affections.
43.	Dughi, Karanta	<i>Cryptolepis buchanani</i>	Climber	Milk	Used for repairing punctures in tyres.
44.	Akas-Bel, Sarag-Bali	<i>Cuscuta reflexa</i>	Climber	Leaves	Used in Veterinary Practice for poultice on sprains.
45.	Mircha-gandh	<i>Cymbopogon martini</i>	Grass	Roots/ Leaves	Roots are used as souvenir for friends & from leaves Aromatic oil is extracted.
46.	Kaladhatura	<i>Datura metel Linn</i>	Shrub	Leaves flowering tops & seeds	Used in treatment of asthma.
47.	Thorn apple, Safed Dhatura	<i>D.stramonium Linn</i>	Shrub	Leaves flowering tops & seeds	Narcotic, used in treatment of asthma. Expectorant, antispasmodic, demulcent and anodyne in cough & asthma.
48.	Nirbisi	<i>Delphinium denudatum wall</i>	Shrub	Roots	Used as tonic and in toothache.
49.	Potato yam, Gaithi, Ratalu	<i>Dioscorea bulbifera Linn</i>		Tubers	Applied to ulcers after drying and powdering.
50.	Bhangra, Mochkand	<i>Eclipta alba Hassk</i>		Entire plant	Anthelmintic, used in hair oils
51.	Amla, Aonla	<i>Emblica officinalis Gaertn</i>	Tree	Fruits	Diuretic & laxative. Phyllembin from fruit pulp mild depressant action on central nervous system & spasmolytic action. Rich source of vitamin 'C' and good liver tonic.

52.	Dhaul Dhak, Madar, Padyara	<i>Erythrina suberosa</i>	Tree	Wood	Used for Scabbards, Ladles, Sieve-frames, Butter & Ghee-pots
53.	Lal dudhi	<i>Euphorbia hirta</i>	Shrub	Entire plant	Drug used in bronchial affections, cough, asthma & in removing worms in children & in bowel complaints.
54.	Pipal	<i>Ficus religiosa</i>	Tree	Bark	An aqueous extract shows anti-bacterial activity.
55.	Kangu	<i>Flacourtia indica</i>	Shrub	Seed	Fruit are edible, bark is astringent & diuretic & applied to eczemas. Part of the bark is given internally only once in dog bite. Fruit are digestive & stomachic.
56.	Pit-papra	<i>Fumaria parviflora Lam</i>		Entire plant	Efficacious in low fever, used as an anthelmintic, diuretic, diaphoretic & aperient.
57.	Goose grass	<i>Galium aparine</i>		Entire plant	Juice is used as diuretic & antiscorbutic.
58.	Glory lilly, Kalihari	<i>Gloriosa superba</i>	Herb	Tubers leaf juice	Used as anthelmintic. Kill lice in hair.
59.	Maror-phali	<i>Helictis isora</i>	Shrub	Fruit/ Bark/ Root	Root is used in cough & Asthma. Leaf paste against skin diseases including eczema. Fruit powder is used in dysentery & vomiting. Fried fruit is given to children to kill intestinal worms.
60.	Kura	<i>Holarrhena antidysenterica</i>	Tree	Seed/ Bark	Bark is useful in dropsy & dysentery. Seeds are astringent & used as febrifuge in diarrhea & intestinal worms.
61.	Kathi, Hakna, Nil	<i>Indigofera pulchella</i>	Shrub	Root	Decoction is given for cough & powder is applied externally for pain in the chest.
62.	Rungru	<i>Kalanchoe spatulata</i>		Leaves	Used in cholera.
63.	Goma, Motapati	<i>Leucas cephalotes</i>		Flowers	Used in form of syrup for cough & cold.
64.	Barnasi	<i>Limonia crenulata</i>	Shrub	Leave/ Root	Tonic, appetiser & useful in fever
65.	Jalapapili	<i>Lippia nudiflora Rich.</i>		Leaves	Alcoholic extract shows antibacterial activity.
66.	Aam	<i>Mangifera indica</i>	Tree	Fruit/ Bark	Acrid, cooling, astringent to the bowels.
67.	Drek	<i>Melia azaderach</i>	Tree	Leaves seeds	Anthelmintic. Used in rheumatism.
68.	Jangli pudina	<i>Mentha longifolia Huds</i>	Shrub	Leaves	Carminative and stimulant.
69.	Indian wild thyme	<i>Micromeria biflora Benth</i>	Shrub	Entire plant	Used as an application for worm infested wounds of cattle.
70.	Kambel, Rohni, Kamala	<i>Mallotus Philippinensis</i>	Tree	Bark/ fruit	Drug kamela used for destroying tapeworms used externally in treatment of skin diseases.

71.	Marua-bel	<i>Marsdenia tenacissima</i>	Shrub	Bark/ Juice	Bark yields a silky-white fibre used for fishing-lines, bow-string by mountaineers, Coagulated milky juice used as Indian rubber.
72.	Sahjan	<i>Moringa pterigosperma</i>	Tree	Fruit/ Bark/ Leaves	Used in gout & acute rheumatism.
73.	Gandhela	<i>Murraya koenigii</i>	Shrub	Leaves	Used for flavour to curries.
74.	Kaiphal, Kaphal	<i>Myrica esculanta</i> <i>Buch.-Ham</i>	Tree	Bark	Decoction used for asthma, diarrhea, lung affection, chronic bronchitis.
75.	Banwan	<i>Myrsine africana</i>	Shrub	Fruit	Used as an anthelmintic.
76.	Kaner	<i>Nerium indicum</i> Mill	Shrub	Leaves	Anthelmintic especially for tapeworms.
77.	Tamakhu	<i>Nicotiana tabacum</i>	Shrub	Leaves	Used for Tobacco.
78.	Harsingar	<i>Nyctanthes arbor-tristis</i>	Tree	Leaves/ Flower	Leaves used for polishing wood, in medicine as a febrifuge and flower used as orange dye.
79.	Sandan	<i>Ougenia oojenensis</i>	Tree	Bark	Used as febrifuge and also as fish poison.
80.	Chil	<i>Pinus roxburghii</i>	Tree	Pine needles/ Oil	As liniment in rheumatic pains as stimulant, expectorant & in chronic bronchitis.
81.	Khajur/ Palm	<i>Phoenix sylvestris</i>	Tree	Fruit/ Leaves	Fruits are edible, cooling, tonic, useful in diarrhea & urinary problems.
82.	Kakkar	<i>Pistacia integerrima</i>	Tree	Galls	Kakrasingi used in native medicine.
83.	Chicha, Chita	<i>Plumbago zeylanica</i> linn	Shrub	Roots	As an appetizer, used in skin diseases, diarrhea, piles, used as application in scabies & unhealthy ulcers.
84.	Raniphul	<i>Polygonum plebejum</i> R.Br.	Shrub	Entire plant	For bowel complaints and in pneumonia.
85.	Bhekhal, Bekkra	<i>Prinsepia utilis</i>	Shrub	Entire plant	Yields oil used as a rubefacient & in rheumatism.
86.	Siali, Sural	<i>Pueraria tuberosa</i>	Shrub	Flowers Roots	Cooling, aphrodisiac. Demulcent & refrigerant in fevers.
87.	Anardana	<i>Punica granatum</i>	Tree	Fruit	Used in diarrhea and dysentery.
88.	Rara	<i>Randia dumetorum</i>	Tree	Fruit	Fruit are edible & pulp of fruit is also given in dysentery.
89.	Chandra- bhaga	<i>Rauwolfia serpentina</i>	Shrub	Entire plant	Used as anti-hypertensive & as sedative. Also employed for relief of various central nervous system disorders, for intestinal disorders.
90.	Basanthi	<i>Reinwardtia indica</i>	Shrub	Stems & Leaves	Applied to wounds infected with maggots, used for treatment of paralysis.
91.	Brass	<i>Rhododendron arboreum</i>	Tree	Flowers	Flowers used for making cold drinks & Jams also used in diarrhoea & in preparation of snuff. Tender leaves are edible & applied on forehead, wood used for making tool handles.

92.	Arandi	<i>Ricinus communis</i>	Shrub	Seeds	Made into paste & are applied to sores, boils & rheumatic swellings.
93.	Locust tree, Robinia	<i>Robinia pseudoacacia</i>	Tree	Leaves & Flowers	Antispasmodic, laxative & emollient.
94.	Kunjo, Kuja	<i>Rosa moschata</i>	Shrub		
95.	Guma	<i>Roylea elegans well</i>	Shrub	Root & leaves	Used as febrifuge.
96.	Manjith, Satavar	<i>Rubia cordifolia linn</i>	Climber	Entire plant	Used in rheumatism & several Ayurvedic preparations.
97.	Jangli-Palak	<i>Rumex nepalensis</i>	Shrub	Roots	Purgative, also used for venereal diseases.
98.	Gurgumma	<i>Salvia moorcroftiana</i>		Roots/ Seeds/ leaves	Used in cough. As emetic. For guinea-worm and itching.
99.	Ritha	<i>Sapindus mukorossi</i>	Tree	Fruit	Used in salivation, epilepsy, chlorosis.
100	Sahdevi	<i>Sida rhombifolia</i>	Shrub	Roots & Leaves	Aphrodisiac, tonic, useful in fever, heart diseases, burning sensations, piles.
101	Barikatai	<i>Solanum indicum</i>	Shrub	Roots	For treating cough, catarrhal affections, colic & nasal ulcers.
102	Kateli	<i>Solanum khasianum Clarke.</i>		Berries	Steroidal drugs.
103	Makoi	<i>S.nigrum</i>	Climber	Entire plant	In treating cirrhosis of liver & for patients suffering from dropsy.
104	Jangli gainda	<i>Tagetes minuta</i>	Shrub	Flowers	Flowers source of essential oil which shows hypotensive, spasmolytic and anti-inflammatory properties. Also as stomachic, diuretic & diaphoretic.
105	Dulal	<i>Taraxacum officinalis weber</i>	Climber	Entire plant	Used as diuretic, stomachic, hepatic, stimulant & tonic.
106	Sarpokha	<i>Tephrosia purpurea (L) pers</i>		Roots	Alexipharmac, good for ulcers & wounds, useful in enlargement of the spleen.
107	Arjun	<i>Terminalia arjuna</i>	Tree	Bark	Cooling, alexiteric, styptic, tonic, antidyenteric, diseases of heart, anaemia, excessive perspiration, asthma.
108	Bahera	<i>Terminalia bellerica</i>	Tree	Bark	Mild diuretic, useful in anaemia & leucoderma.
109	Harad	<i>T.Chebula Retz.</i>	Tree	Fruits	Astringent, useful in dysentery & diarrhea, good in ophthalmia, diseases of the spleen, piles, cold in the head.
110	Andhahuli	<i>Trichodesma indicum linn</i>		Entire plant	Beneficial in diseases of the eye. It helps in the expulsion of the dead foetus.
111	Common Nettle	<i>Urtica dioica</i>		Roots	Diuretic.
112	Gidartamaku	<i>Verbascum thapsus linn</i>		Entire plant	Demulcent, astringent& pectoral. Used in pulmonary diseases.



113	Sododi, Sadori	<i>Vernonia cinerea</i> <i>less</i>		Entire plant	Tonic, stomachic, astringent. Cures asthma, bronchitis.
114	Banafsha	<i>V.Serpens</i>	Herb	Roots	Purgative, good febrifuge, tonic, expectorant, diuretic, removes inflammation
115	Ban,Banda	<i>Viscum album</i>		Berry	Laxative, tonic, aphrodisiac, diuretic, cardiotonic, used in inflammations
116	Nirgundi, Bana, Samhalu	<i>Vitex negundo</i>	Shrub	Leaves	Considered tonic, smoked for headaches and applied to rheumatic swellings of joints.
117	Akri, Ashwagandha	<i>Withania</i> <i>somnifera(L)Dunal</i>		Fruits	Used for liver complaints, asthma & biliousness.
118	Dawi, Dhai	<i>Woodfordia</i> <i>fruticosa Kurz.</i>	Shrub	Flowers	Used in dysentery, astringent tonic & in disorders of the mucous membrane.
119	Banokra	<i>Xanthium</i> <i>stramonium linn</i>	Shrub	Fruits	Rich in vitamin C, used against chronic malaria and urinary troubles.
120	Tejphal, Tirmira	<i>Zanthoxylum</i> <i>armatum DC.</i>	Shrub	Bark, fruits & seeds Fruits	Carminative, stomachic & anthelmintic.
121	Jharber, Jharberi	<i>Z.nummularia</i> <i>(Burm.f.)wt.&amp;Arn.</i>		Fruits	Appetizer, stomachic.
122	Ber	<i>Zizyphus</i> <i>mauritiana</i>	Shrub	Leaves/ Fruit	Laxative, given in throat troubles, source of vitamin 'C' & Sugars.

**2.9.6. STOCK MAPS:** -As the medicinal plants are mostly herbs and shrubs found on annual or perennial basis, stock mapping is not possible.

**2.9.7. CALCULATION OF YIELD:** -No yield can be prescribed as the most NTFPs are extracted through right holders. However, proper record of all the NTFPs exported through Panchayats and the department, should be maintained annually and entered in respective compartment history files.

**2.9.8. METHOD OF TREATMENT:** - There is not much information available on the occurrence of medicinal herbs and species and there are still fewer records on the yield estimates of such species. A lot needs to be done in the field of conservation, development and management of NTFPs. This would be in accordance with the National Forest Policy of 1988, where in conservation and propagation of NTFPs and their contribution towards the local economy have been given due recognition and emphasis. In this Forest Division, resin, medicinal plants, bamboo, tannins, Katha and grasses are the important NTFPs contributing to the local economy. Resin and bamboo are being exploited on

commercial basis already and grass is being locally exploited. As there are not many Khair trees in forest lands, katha is not extracted commercially. Information on medicinal plants is not readily available and there is a need to study and document the occurrence, yield estimates, exploitation and marketing of valuable medicinal plants in the division.

**2.9.8.1. ROTATIONAL EXTRACTION:** -Unscientific and unsystematic extraction of medicinal plants is likely to reduce the yield and quality of the plants and may even lead to disappearance of the species. A four year extraction cycle of the medicinal plants is already in force. This cycle will continue and is extended to the plan period as under in Table: 2.9.2.

**Table: 2.9.2. Four Year Cycle of Extraction of NTFP's**

Range	Blocks	Years when Extraction will be allowed
(i) Baijnath (ii) Daroh (iii) Palampur	Deol Thural Panaper	2010-11, 2014-15, 2018-19 and 2022-23.
(i) Baijnath (ii) Daroh (iii) Palampur	Chadhiar J/singhpur Gopalpur	2011-12, 2015-16, 2019-20 and 2023-24.
(i) Baijnath (ii) Daroh (iii) Palampur	Baijnath Daroh Palampur	2012-13, 2016-17, 2020-21 and 2024-25.

**2.9.8.2. ARTIFICIAL PROPAGATION AND CONSERVATION:** - Keeping in view the economic importance and demand of medicinal herbs, it is desirable to encourage naturally occurring medicinal plants in suitable localities. The demand of medicinal plants has picked up with setting up of pharmaceutical industries in the state. The existing germplasm of different herbs needs to be conserved. Following measures are suggested for the conservation, protection and propagation of medicinal plants:-

- (i) Systematic rotational collection should be followed strictly as given in Table 2.9.2.
- (ii) Heavy grazing and destruction of medicinal herbs should be checked as these species do not produce sufficient seeds/vegetative form of regeneration.
- (iii) The raising of nurseries/herbal gardens, drug farms should be developed through various research institutes like HFRI, UHF, Nauni, HPKVV

Palampur, CSIR Palampur, Ayurveda department who are engaged in medicinal and aromatic plants .

- (iv) Medicinal plant collectors should be educated and provided proper information or guidelines so that there is continuous regeneration of medicinal herbs.
- (v) The community based organizations like Mahila Mandals, Yuvak Mandals, VFDCs /JFMC's and other rural co-operatives should be involved in the development, protection, propagation and conservation of medicinal plants.

#### **2.9.9. POLICY ON INTRODUCTION OF MEDICINAL TREES IN FORESTS:**

-It is now the state policy that in different plantations of the forest department about 30% of the trees being planted need to be of medicinal value and also native to the tract where plantation is being done. There is thus a need to identify and grow suitable medicinal trees for different altitude zones in a particular forest division. While most trees may be technically "medicinal", it is important that species like deodar, khair, chil etc. which are normally grown in forest plantations are not reckoned as medicinal trees. In Karsog Forest Division, the low lying nurseries i.e. < 1200 mts. need to grow species like Amla, Harar, Behra, Bel (bil) etc. in sufficient numbers.

**2.9.10. SUBSIDIARY SILVICULTURAL OPERATIONS** As no silvicultural system is prescribed, no specific operations are proposed. However, when the medicinal plants are raised in the nurseries or plantations, the regular operations like closure, weeding, bush cutting, protection from fire, grazing etc. are to be carried as in case of tree species.

**2.9.11. MISCELLANEOUS REGULATIONS:** - This includes extraction or collection and export of NTFP's. The collection of NTFPs is allowed strictly as per provisions of Settlement report. The export is allowed under HP Forest Produce Transit (Land Rout) Rules, 1978 against payment of specified export permit fee.

**2.9.12. CONTRIBUTION TO INCOME AND QUALITY OF LIFE IN RURAL AREAS:** - In the rural setup, NTFPs form an integral part of the daily lives of the villagers, varying from personal hygiene, cosmetics, nutrition, household items for use of livestock medicine and even at times are a source of additional income to rural households.

The NTFPs should be given the due thrust and species yielding them should be included in the plantation programme. Nurseries should raise sufficient stock of medicinal and other plants of economic importance and make them available to the local population desirous of planting them. With many JFM schemes being under operation in the division, the stakeholders should be encouraged to include such species in JFM micro plans.

As in other parts of India and in the state, the rural people use plant based traditional medicines for health care. Since they are still produced using old methods, their quality, efficacy and shelf life gets adversely affected. Hence there is a need to introduce low cost, appropriate and simple technologies to encourage this dwindling practice and bring in additional income to rural households. Collection processing, value addition and marketing aspects of NTFPs need to be studied and the administration should provide all necessary help in this regard to training programmes on various aspects of NTFPs i.e. collection, refinement, value addition, storage and marketing should make growing and trading of NTFPs more remunerative.

As far as the medicinal plants are concerned, this area has not received much attention resulting in neglect and improper realization of the potential of this resource. Hence there is a need for initiation of more action-oriented plans, bearing in mind the conservation issues such that the rural household incomes could be augmented. There should be facilities for Pilot scale production and replication of positive results; development of low-cost, appropriate technologies, assurance of quality of raw materials and final products, marketing and marketability analyses, training in all aspects of medicinal plant production, management and marketing, research and development i.e. development of superior propagation materials, improvement in quality and yield, agro technology, efficient processing technologies etc. and knowledge of procedures for registration and property rights.

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## CHAPTER-X

### THE FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE

#### (A) 2.10.1. FIRE:

**GENERAL:** -Fire is a major factor that causes considerable damage to the forests of this division. The fires both accidental and incendiary are very common in this tract due to the reason that majority of forests are easily approachable by roads/Paths and National/State Highways, other roads, Railway track are passing along/through most of the forests. Also most of the forests lie in dry/hot areas. As most of the forests are either chil or scrub forests, any incident of severe fire has a considerable adverse effect not only on the vegetation but it also deteriorates the habitat.

Fire has an adverse effect on soil, water and ecological balance of the affected area. Soil becomes vulnerable to soil erosion and its structure gets affected, thereby retarding plant growth. The soil building micro-organisms are destroyed and the area is ultimately rendered susceptible to erosion and decreasing productivity. The young regeneration is wiped out, growth of surviving vegetation is adversely affected, the yield of forest produce is immensely reduced and the vegetation damaged by fire becomes vulnerable to insect and fungal attack. The high salvage removals are attributed to this. In the fire burnt forests change in crop pattern takes place, resulting in mixed crop in the forests. Many ban oak areas have now been invaded by fire resistant species like chil as a result of repeated fires. A mention of fire as a factor that causes injury to the forest crop has already been made in Chapter II “Flora and Fauna” of Part I of this plan. The Chil forests in this division are highly susceptible and are subject to frequent fires in the months of April to June. Because of all these reasons prevention and control of forest fire assumes great importance in Palampur Forest Division and there is an urgent need to take effective steps to counter the menace of forest fires, with the aim of:

- a) Protecting forests from damaging fires by taking up all preventive measures like administrative, technical, social, legal etc.
- b) Preparing adequately and taking appropriate action for controlling, suppressing and extinguishing forest fires, in order to minimise the loss caused by them;
- c) Educating local people about fire damage and eliciting their cooperation in preventing, controlling and extinguishing fires.

**2.10.2. CAUSES OF FOREST FIRES:** -The main causes attributable for the out break of fires are various and can be summarised as under:-

**2.10.2.1. NATURAL:** - This is caused due to lightening, friction between quartzite stones and dry bamboo culms. Such fires are rare.

**2.10.2.2. ACCIDENTAL:** - Such fires are more common and are caused due to

- i) Charcoal burning and control burning the forests.
- ii) Gross carelessness of the passers by, smokers, graziers, hikers, campers, hunters, wood collectors, honey collectors, labourers working in the forests etc.
- iii) Burning of refuse in the cultivated fields by the people without suitable precautions or supervision.

**2.10.2.3. INCENDIARISM:** -

- i) People set fire to forest under the false belief, that the resultant grass growth will be better and more abundant.
- ii) Fires are started for scaring away wild animals for poaching.
- iii) Fires are caused to destroy the evidence of crimes committed or damage caused to forest property.

**2.10.3. DETAIL OF FOREST FIRE INCIDENTS:** - The details of fire incidents in this division during previous plan period has been discussed under para 2.4.2 of chapter II (part-I)

**2.10.4. FACTORS CONTRIBUTING TO FIRE DAMAGE:** -Fire is the product of fire environment, which has mainly following components:

- (i) High temperature
- (ii) Low humidity
- (ii) Inflammable material

**(i) High temperature:** - With the increase in temperature during summer season, the possibility of fire increases. In this area 37°C is considered the critical temperature, above which the cases of fires keep on increasing with increasing temperature. The detection of fire danger day can be assessed with the help of thermometer.

**(ii) Low humidity:** - This factor also contributes towards spread of fire. The areas which are more humid are less prone to fire, than the areas, which have low humidity in summers. This is the reason that the casual rain-fall reduces the fire risk for a few days.

**(iii) Inflammable material:** - In most of the forests, grasses, chil needles, resin, fallen trees, bushes etc., make ample inflammable material. The possibility of forest fire depends upon the quantity of inflammable material on forest floor. To reduce the inflammable material in forests, control burning is done.

**2.10.5. FIRE SEASON:** -The greatest danger of fire occurrence is during summer months from April to early July, up to the commencement of monsoon rains. During autumn, normally, the danger of forest fire is less but occasionally the fires do occur in this period also.

**2.10.6. Special Fire risk zones:** - The areas burnt during previous years indicate that the following blocks of forests are especially prone to fires: -

**Table: 2.10.1. Showing Fire Prone areas**

Sr.No.	Block of Forest	Range
1	2	3
1.	Diala-Barsar	Palampur
2.	Bandla upto Awa khad	-do-
3.	Gopalpur-Lahla-Paror.	-do-
4.	Khalet-Maranda-Arla Saloh.	-do-
5.	Ghanetta-Jaman Nal-Rajhoon.	-do-
6.	Jhunga Devi-Dheera-Jauna.	0do-
7.	Sihol-Bhatlu-Naura.	-do-
8.	Devi-Marhoon-Nagani.	-do-
9.	Mundi-Baloh-Linjan-Purba.	-do-
10.	Thural-Duhak-Balakrupi.	Daroh
11.	Jaisinghpur-Dhar Chhatotarian.	-do-
12.	Andretta-Gagahan-Badera.	Bajjnath-Daroh.
13.	Bhagun-Tamber-Jaisinghpur.	Droh
14.	Ban Deol-Sansal-Panjala.	Bajjnath
15.	Bhattu-Baggidhar-Dhanag.	-do-
16.	Kudail-Chobin-Duhak.	-do-
17.	Sansai-Chadiar-Chamb.	-do-

Special attention is required for the above forest zones during the fire season.

**2.10.7. MANAGEMENT OF FIRE PROTECTION:** -The following steps will prove effective in fire management.

- Fire prevention measures
- Timely detection of forest fires and information to concerned staff.
- Process of fire control and fire fighting.
- Penal provisions and a system of rewards

**2.10.7.1. Fire Prevention measures:** -“Prevention is better than cure”, and this holds good in case of forest fires too. Prevention of fire is more beneficial and cost effective than fighting the fire. For this effective steps should be taken well in time, such as summarised below:-

**2.10.7.1.1. Earning good will of local people:** -The forests cannot be protected against fire without winning the good will and co-operation of the local people. This can be done by making regular contact with local villagers and meeting the reasonable bonafide demands of right holders, well in time. Also, the closures made should be affected for the minimum required period.

**2.10.7.1.2. Education and publicity:** -Wide publicity especially in villages nearby forests should be given against the harms caused by forest fires. For this, timely action should be taken for distribution of pamphlets and other educative material during the fire season, well in advance, so as to acquaint the villagers/local people through Panchayats. The staff should hold regular meetings with local villagers in their areas to create awareness. Also, hoardings, notice boards and banners should be displayed at prominent points to make aware the tourists and local public regarding the damage caused by fires

**2.10.7.1.3. Restriction on tarring of roads:** -During fire season, tarring of roads in forest areas should be banned, as P.W.D staff/labour burns fire underneath drums of bitumen leading to wild fires.

**2.10.7.1.4. Concept of Joint forest management:** -Joint Forest Management may help in preventing and controlling fires. For this active participation of local villagers should be sought by involving people in forestry activities.

**2.10.7.1.5. Removal of pine needles:** - Local villagers should be allowed and encouraged to collect and remove the fire needles, before hand, for domestic purposes and use as packing material for fruits and vegetables, fire bricks and other alternate uses. A small unit for preparation /manufacturing of fire bricks from dried / fallen pine needle has been established adjoining to Palampur Forest Division at Nagrota town. The strategy to collect, bundle/baling, and transport pine needle from forest areas be chalked out in participation with VFDC,s / JFMC,s / local people of the area and collaborating with manufacturers. This will reduce the fire hazard to a great extent.

**2.10.7.1.6. Cleaning and thinning in regeneration areas:** -All regeneration areas, should be isolated by cleaning a strip of 3 metre width all around from the inflammable material like leaves, bushes etc. Early cleanings and thinning in young regeneration should be done, to give a spacing of 1 metre.

The pruning of trees, which have attained a height of 1.5 metres, should be done upto  $\frac{1}{3}$ rd of their height and debris should be collected at suitable Nallah/place and control burnt.

**2.10.7.1.7. Fire protection staff:** -Divisional Forest Officer will engage sufficient number of firewatchers in consultation with the Conservator of forests, during the fire season. Fire watchers (preferably the local villagers), will patrol the areas extensively for detection and protection against fires and will ensure all



preventive measures with the local forest field staff. During fire season fire fighting squad be formed out of the daily waged who have been regularised. This squad should always be ready at every Range/Block H.Q. and as soon as any intimation of fire occurrence is received, they be rushed on “Fire Pick up Van”, to that spot.

**2.10.7.1.8. FIRE PROTECTION EQUIPMENTS:** -The field staff (near the fire prone forests) should be provided with sufficient fire fighting equipments, such as brooms, shovels, slashers, axes, hatches, forks, buckets, gunny bags etc, so as to meet any emergency and for facilitating the speedy extinguishing of fire. Field staff should be imparted training for effectively controlling forest fires.

**2.10.7.1.9. FIRE LINES:** -The existing fire lines be properly maintained and kept clear of all bushes, needles etc. to avoid any chance of fire. This division has a very good network of National/State Highways, link roads, bridle/inspection paths, Railway passing along or through the majority of forests. Hence, no new fire lines are proposed. It is laid down that all such roads/paths/Railway track should be kept clear of all inflammable material especially during the fire season, so as to act as fire lines. The detail of existing fire lines is given in Table 2.10.2 and the fire lines below.

**Table: 2.10.2. Showing list of existing fire lines**

Sr. No.	Range.	Forest.	Length (Km.)	Width (m.)
1	2	3	4	5
1	Palampur	P.24 P. Ghunetta.	2.500	10
2	-do-	CFS Bhagotla	1.500	10
3	-do-	P.17P.Bhandiara	0.500	10
4	-do-	CFS Bhagotla	0.500	10
5	-do-	P 20P. Paror	1.600	10
6	-do-	CFS Gaggal	1.200	10
7	-do-	U 8 P Kandi	3.000	10
8	Bajjnath	P.13 B. Baggidhar & U.P.31B. Baggidhar	1.500	10
9	-do-	P.21 B Andretta	1.500	10
10	-do-	P.12 P. Panjala	1.500	10
11	-do-	U.43 B. Bhadraina	1.00	10
12	Daroh	P. 40 J. Duhak	2.500	10
13	-do-	P.23P. Ban-Kurang	1.500	10
	<b>Total</b>		<b>20.300</b>	

Source: Palampur Forest Division.

**2.10.7.1.10. CONSTRUCTION OF WATCH TOWERS:** -A net work of watch towers, at suitable commanding locations, should be developed. These should be permanently manned by fire watchers/Forest Workers during the fire season. The fire watcher will immediately come to know and report to the beat guard, any out break of fire that may occur. The beat guard will take further necessary action for

fire fighting. Fire watch towers, may be constructed wherever considered necessary. However following fire watch towers are proposed to be constructed in Palampur forest division in Table 2.10.3.

**Table: 2.10.3. List of proposed fire watch towers**

Sr. No.	Range	Place	Remarks
1	2	3	4
1	Daroh	Balakrupi	Near I/Hut Balakrupi
2	-do-	Jaind	Near I/Hut Jaind
3	-do-	Ban-Mandu	P.43 J. Ban-Mandu
4	Palampur	Darang	P.55 P. Darang

**2.10.7.1.11. CONTROL BURNING:** -The Chil forms a thick bark at an early age, by virtue of which it can resist the effects of slow fire and this property is of great advantage and development of control burning. The burning should be thoroughly planned and organised and should be carried out under the supervision of competent officials.

All the forests must be isolated by clearing a strip of 1 metre width, of all inflammable material, leaves, bushes etc. to act as fire barrier during the fire season. Grazing by cattle, should be permitted, in order to reduce inflammable material in the forests.

It is most essential, that forests, allotted to, Chil Working Circle are adequately protected against fire. The control burning is the most important operation and should never be neglected. The triennial programme for control burning is the most important operation and should never be neglected. The triennial programme for control burning is chalked out and is given in following table.

**Table: 2.10.4. TRIENNIAL PROGRAMME FOR CONTROL BURNING**

FELLING SERIES-I						
	2010-11, 2013-14, & so on.		2011-12, 2014-15, & so on.		2012-13, 2015-16, & so on.	
Range	Name of Forest (comptt.)	Area (ha)	Name of Forest (comptt.)	Area (ha)	Name of Forest (comptt.)	Area (ha)
1	2	3	4	5	6	7
<b>Bajnath.</b>	P.11 B. Sansal (3)	19.42	P.12 B. Panjala (1a)	5.67	P.12 B. Panjala (1d)	10.52
	P.12 B. Panjala (1b)	11.33	P.12 B. Panjala (2a)	14.97	P.12 B. Panjala (2d)	10.52
	P.12 B. Panjala (2b)	6.48	P.12 B. Panjala (2c)	7.28	P.13 B. Baggidhar(1)	41.67
	P.12 B. Panjala (1c)	9.71	P.13.B. Baggidhar(2b)	16.19	P.13 B. Baggidhar (2c)	17.81
	P.13 B. Baggidhar (2a)	16.19	P.73.B. Mandher khurd. (whole)	32.56	P.13 B. Baggidhar (3a)	12.95
<b>Palampur.</b>	P.17P. Bandhiara (2)	15.38	P.17P. Bandhiara (1)	8.50	P.17 P. Bandhiara (4)	9.71
	P.19 P. Lahla (1a)	12.14	P.19 P. Lahla (1b)	6.88	P.19 P. Lahla (1c)	10.12
	P.19 P. Lahla (1d)	5.67	P.19 P. Lahla (2a)	10.52	P.19 P. Lahla (2b)	12.14
	P.19 P. Lahla (2c)	15.78	P.19 P. Lahla (2d)	11.33	P.19 P. Lahla (3a)	47.34

	P.19 P. Lahla (3b(i).)	21.04	P.19 P. Lahla (3b(ii).)	48.96	P.19 P. Lahla (3c(i).)	30.10
	P.19 P. Lahla (3c(ii).)	38.69	P.19 P. Lahla (3d(i).)	19.42	P.19 P. Lahla (3d(ii).)	19.42
	P.19 P. Lahla (4a)	6.07	P.19 P. Lahla (4b)	6.88	P.19 P. Lahla (4c)	5.62
	-	-	P.20 P. Paror (whole)	18.22	P.19 P. Lahla (4d)	6.07
	P.24 P. Ghunetta (1a)	11.74	P.24 P. Ghunetta (1b)	15.78	P.24 P. Ghunetta (1c)	13.35
	P.24 P. Ghunetta (1d)	13.76	P.24 P. Ghunetta (2a)	23.06	P.24 P. Ghunetta (2b)	15.78
	P.24 P. Ghunetta (2c)	14.16	P.24 P. Ghunetta (2d)	12.14	P.24 P. Ghunetta (3a)	6.07
	P.24 P. Ghunetta (3b)	9.30	P.24 P. Ghunetta (3c)	10.53	P.24 P. Ghunetta (4a)	7.69
	P.24 P. Ghunetta (4b)	5.67	P.25 P. Dhinju (1b)	5.26	P.24 P. Ghunetta (4c)	8.09
	P.25 P. Dhinju (1a)	2.43	P.27 P. Khatin (1a)	26.30	P.25 P. Dhinju (1c)	8.09
	P.25 P. Dhinju (1d)	4.86	P.31 P. Sakrotu (2)	9.71	P.26 P. Bheru (3)	15.37
	P.26 P. Bheru (2)	12.95	P.56 P. Cheli (1)	9.71	P.31 P. Sakrotu (3)	16.19
	P.31 P. Sakrotu (1)	12.95	P.55 P. Darang	12.75	P.56 P. Cheli (2)	22.11
<b>Daroh.</b>	P.36 P. Bajur-Gahar (1a)	6.48	P.36 P. Bajur-Gahar (1b)	5.26	P.36 P. Bajur-Gahar (1c)	14.16
	P.40 P. Duhak (1)	27.52	P.36 P. Bajur-Gahar (1d)	2.83	P.40 P. Duhak (2a)	6.48
	P.40 P. Duhak (3a & 4)	25.90	P.40 P. Duhak (3b)	30.75	P.40 P. Duhak (2b)	17.81
<b>FELLING SERIES-II</b>						
<b>Bajnath.</b>	U.P.27 B. Dhanag (1)	14.16	P.29 B. Sakri-Khas (4)	6.07	U.P.27 B. Dhanag (2)	22.26
	U.P.30 B. Gadiara (whole)	14.57	U.P.31 B. Baggidhar (2)	54.62	U.P.31 B. Baggidhar (3)	24.28
	U.P.31 B. Baggidhar (1)	14.16	U.P.31 B. Baggidhar (5)	8.90	U.P.31 B. Baggidhar (6)	58.27
	U.P.31 B. Baggidhar (4)	56.65	U.P.36 B. Kudail-Buhli (2)	13.35	U.P.37 B. Chaniara (2)	9.71
	U.P.36 B. Kudail-Buhli (1)	21.85	U.P.37 B. Chaniara (1)	10.12	U.P.40 B. Duhak (4)	5.26
	U.P.38 B. Chobin (1)	8.09	U.P. 41 B. Sansai-I (3)	33.99	U.P.42 B. Sansai-II (1c)	9.22
	U.P.40 B. Duhak (2)	14.16	U.P.125 B. Sansal (2a)	2.05	U.P.125 B. Sansal (4)	39.66
	U.P.42 B. Sansai-II (1a)	21.28	U.P.125 B. Sansal (5)	27.52	U.4 B. Lanod (3)	47.74
	U.P.125 B. Sansal (1)	7.80	U.4 B. Lanod (2)	64.34	U.4 B. Lanod (6)	73.64
	U.4 B. Lanod (1)	12.14	U.5 B. Deol (3)	18.21	U.5 B. Deol (4)	20.64
	U.4 B. Lanod (4)	37.64	U.5 B. Deol (6)	40.06	U. 7 B. Bhattu (2)	14.57
	U.5 B. Deol (1)	14.57	U.21 B. Kand-I (1)	57.05	U. 7 B. Bhattu (1)	49.36
	U.23 B. Kharas-Karot (1)	25.09	U.44 B. Ghorpith (2)	17.00	-	-
<b>Palampur.</b>	U.P.5 P. Barsar	11.88	U.P.10.P. Ghamrotha (1)	8.90	U.P.3 P. Diala (1)	48.55
	U.P. 11 P. Rakh (1)	3.41	U.P.13 P. Bandhiara	21.45	U.P. 11 P. Rakh (2)	10.43
	U.P. 14 P. Gopalpur (1)	2.28	U.P. 14 P. Gopalpur (2)	2.67	U.P.15 P. Darang (1)	5.89
	U.P.15 P. Darang (2)	6.23	U.P.15 P. Darang (3)	28.93	U.P.16 P. Drati (1)	22.66
	U.P.17 P. Asanpatt (1)	4.09	U.P.15 P. Darang (2)	11.05	U.P.19 P. Lambapatt	14.97
	U.P.20 P. Gadiara	19.02	U.P.22 P Hanglow(1)	6.07	U.P.22 P. Hanglow(2)	5.67
	U.P.24 P. Bindraban (1)	12.14	U.P.24 P. Bindraban (2)	12.95	U.P.24 P. Bindraban (3)	36.42
	U.P.121 P. Brankar (1)	20.23	U.P.122 P. Mahadev (2)	6.48	U.P.122 P. Mahadev (3)	6.07
	U.P.123 P. Ludran (1)	13.35	U.P.123 P. Ludran (2)	7.28	U.P.124 P. Charkhola	12.95

	U.3 P. Bandla (1)	34.80	U.3 P. Bandla (2)	82.13	U.3 P. Bandla (3)	12.14
	U.3 P. Bandla (4)	16.19	U.8 P. Kandi (1a)	38.45	U.8 P. Kandi (2)	54.22
	U.8 P. Kandi (1b)	7.28	U.8 P. Kandi (3)	14.16	U.8 P. Kandi (4)	7.28
<b>Daroh.</b>	U.P.51 J. Dhaniara (1)	14.16	U.P.51 J. Dhaniara (2)	34.40	U.P. 60 P. Thural-I (1)	17.40
	U.P. 60 P. Thural-I (5)	8.50	U.P.65 P. Baloh (2)	7.28	U.P.65 P. Baloh (3)	5.67
	U.P.65 P. Baloh (4)	10.12	U.P.70 P. Bhranta (2)	8.50	U.P.73 P. Gadella (3)	24.68
	U.P.85 P. Nagni (2)	17.40	U.P.87 P. Fasta	12.14	U.P.91 P. Paled, Lalehr & Besdi (3)	27.52
	U.P.92 P. Jamula Talinu (1)	12.55	-	-	-	-
FELLING SERIES-III						
<b>Palampur.</b>	Arla-Saloh (U.P.-2)	6.47	Arla-Saloh (U.P.-3)	9.71	Arla-Saloh (U.P-4)	5.67
<b>C.F.S.</b>	Arla-Saloh (U.P-5)	6.07	Arla-Saloh (U.P-6)	2.83	Arla-Saloh (U.P-7)	7.69
	Arla-Saloh (U.P-8)	7.69	Arla-Saloh (U.P-10)	19.02	Arla-Saloh (U.P-11)	10.52
	Arla-Saloh (U.P-12)	3.64	Arla-Saloh (U.P-13)	11.73	Arla-Saloh (U.P-15)	8.50
	Arla-saloh (U.P-9)	1.61	Bhagotla (U-1)	10.12	Bhagotla (U-2)	2.43
	Bhagotla (U-4)	5.66	B.M.-6	16.99	Bhagotla (U-7)	10.92
	Bhagotla (U-10)	3.24	Gaggal (U.P-1)	5.66	Gaggal (U.P-7)	1.62
	Gaggal (P-16)	7.28	Gaggal (P-17)	8.09	Gaggal (P-18)	8.50
	Gaggal (U.P-20)	7.28	Gaggal (U.P-23)	0.81	Gaggal (U.P-24)	2.02
	Gaggal (U.P-27)	1.62	Gaggal (U.P-29)	2.02	Gaggal (U.P-30)	4.45
	Gaggal (U.P-31)	5.66	Gaggal (U.P-32)	6.88	Gaggal (U.P-34)	2.83
	Gaggal (U.P-35)	2.43	Gaggal (U.P-36)	4.05	Gaggal (U.P-38)	4.86
	Gaggal (U.P-39)	2.43	Gaggal (U.P-40)	2.83	Gaggal (U.P-45)	4.05
	Gaggal (U.P-46)	2.83	Gaggal (U.P-50)	2.02	Gaggal (U.P-53)	3.24
	Gaggal (U.P-55)	9.71	Gaggal (U.P-57)	2.02	Gaggal (U.P-59)	6.88
	Gaggal (U.P-60)	1.62	Gaggal (U.P-63)	4.05	Gaggal (U.P-66)	2.83
	Gaggal (P-69)	12.95	Gaggal (P-70)	8.09	Gaggal (U.P-71)	5.26
	Gaggal (P-72)	11.74	Gaggal (P-73)	9.71	Gaggal (P-74)	8.90
	Gaggal (U.P-75)	7.69	Khalet (P-1)	8.10	Khalet (P-2)	8.50
	Khalet (P-3a)	11.73	Khalet (P-3b)	12.13	Khalet (U.P-5)	3.64
	Khalet (U.P-6)	1.21	Khalet (U.P-7)	2.43	Khalet (U.P-9)	2.43
	Khalet (U.P-12)	3.24	Khalet (U.P-17)	1.62	Khalet (U.P-18)	2.83
	Khalet (U.P-19)	3.24	Khalet (U.P-21)	0.81	Kushmal (U-1)	26.30
	Kushmal (U-2)	21.04	Kushmal (B.M.-3)	5.66	Kushmal (B.M.-4a)	24.28
	Kushmal (B.M.-4b)	6.47	Kushmal (B.M.-5a)	16.99	Kushmal (B.M.-5b)	2.02
	Kushmal (U-6)	15.38	Maranda-Bhangiar (B.U.P-2)	1.62	Maranda-Bhangiar (B.U.P-3)	1.62
	Maranda-Bhangiar (M.U.P-1)	2.83	Maranda-Bhangiar (M.U.P-2)	4.04	Maranda-Bhangiar (M.U.P-3)	6.88
	Panaper (P-1)	15.78	Panaper (P-2)	21.04	Panaper (P-3)	20.64
	Panaper (U.P-11)	4.04	Panaper (U.P-13)	4.45	Panaper (P-17)	15.38
	Panaper (P-18)	6.47	Panaper (P-19)	6.47	Panaper (U.P-21)	4.04
	Paror (P-1)	18.21	Paror (P-2)	18.21	Paror (P-3)	14.16
	Paror (U.P-4a)	11.33	Paror (U.P-4b)	11.33	Paror (U.P-5a)	1.62
	Paror (U.P-5b)	7.28	Paror (U.P-6)	8.50	Paror (U.P-7)	27.92
	Paror (U-8)	17.40	-	-	-	-
<b>Daroh.</b>	Balota (U.P-1)	6.07	Balota (U.P-2)	6.07	Balota (U.P-5)	2.43
	Maniara (U.P-3)	25.49	Maniara (P-4a)	7.69	Maniara (U.P-5)	8.90
	Maniara (U.P-6)	10.11	Maniara (U.P-7)	7.28	Maniara (U.P-9)	16.19
	Maniara (U.P-13)	12.54	Maniara (U.P-20)	7.40	Maniara (U.P-22)	15.78
	Maniara (U.P-23)	2.43	Punner-Dehan(U.P-1)	1.61	Punner-Dehan (U.P-2)	5.66

The forest areas have been prescribed in full, however it is laid down that all the forest areas planted should not be controlled burnt, until the plants attain a height of 1.5 Meter. The detailed instructions on control burning are contained in the H.P. Forest Manual Vol. IV and are summarised as below: -

- (1) The control burning should always be done during winters in January-February.
- (2) Burning should progress from uphill to down hill in calm weather and special care should be taken, to keep the line of fire as straight as possible and under control.
- (3) The fire should start along the ridge, a cleared path or especially cleared lines.
- (4) Chil needles and other inflammable material should be fully raked to ensure through burning.
- (5) In forests under resin tapping, it must be ensured that all chips, fallen resin, needles, etc. are cleared about 1.5 m away from the base of the trees by the resin labourers.
- (6) Cleanings and early thinning in young regeneration areas must be completed before the control burning.
- (7) Burning shall be done always under strict supervision and control of the executive staff and shall never be left to the engaged labour.
- (8) The existing fire lines should be properly maintained and kept clear. The roads, bridle and inspection paths etc. must be kept clear of all inflammable material, so as to act as fire lines.
- (9) Sufficient number of trained fire watchers should be employed during the fire season to help the field staff and provided with necessary equipments. No felling operations, even to the right holders, should be allowed during the fire season.

It is, however, to be noted that areas under regeneration should not be control burnt, until the regeneration reaches a height of about 2.5 m. In such areas, however, the grass cutting/needle collection by right holders is encouraged.

The control burning will also form a part of control forms and deviation reflected therein should be explained very clearly giving valid reasons.

**2.10.7.1.12.** In order to protect the forests, against fire risk, in case of other forests allotted to Protection cum Rehabilitation working circle, which are not included under chil working circle and are not prescribed for control burning, and to maintain the sanitation of the forests, the following guidelines/steps are laid down:-

- (1) The inflammable/fire hazard material, from the forests should be collected and disposed off during the winters.

- (2) The job should be got done preferably, through the regular forest workers of concerned ranges.
- (3) Collection of humus and other inflammable material should begun by raking from top of the forest and working down hill.
- (4) Stack in moderate heaps in open places or suitable Nallahs.
- (5) Burn the heaps down hill so that the smoke does not interfere with men working below and reduces the risk of fire.
- (6) Burn the heaps in rotation to reduce the heat.
- (7) Burning operation should be carried out under the supervision of forest guard concerned.
- (8) Steps should be taken to make it mandatory for right holders and Forest Corporation, to collect the felling refuse after felling trees into heaps or its removal from the forest should be specified.

**2.10.7.1.13. FIRE FIGHTING:** -When a fire is observed, Forest Guard or the fire watcher should at once inform the Block Officer (Dy.Ranger) and the Range Forest Officer. He should also inform the President of the local Panchayat immediately, as well as, the staff of the Government Offices or institutions situated in the vicinity and seek their help in the fire fighting operations. In case of alarming situations, immediate help of various organisations like Army Cantonment Head Quarters, Fire Brigade, N.C.C., N.S.S., situated near the vicinity of each range can be availed. District Administration may be requested for immediate help, as and when, required. Beating with a broom of green bushes normally controls the fire.

Fire fighting methods have been given in the Punjab leaf let No-8 and practical forest management by Trevor and Smythies. For guidance of field staff, the method is given in brief here. The Senior Officer present will immediately, take command of the operations. He should know the local geography and have some idea of labour force. The labour force should be organised in sections of suitable strength each under the order of one man and given definite task. A couple of men should be kept in waiting to take messages and instructions to the various section. In case the fire goes beyond control, it is necessary to localise it by counter firing. Counter firing should only be done under order of a senior officer in charge of operations and attempted from a defined line such as road or ridge or fire line. A line is formed along the ridge by clearing the forest floor and cutting bushes and from this fire is started, so as to consume the fuel in advance of the on coming fire. Wind direction and gradient should always be kept in mind, while counter firing. Roads/Paths are useful, provided, enough manpower is present. After the fire has been brought under control, the smouldering stumps should be extinguished by putting the dug earth on them and strict vigilance be kept till all dangers of fire spreading are taken care of. Arrangement for the transport of food, water and adequate fire fighting tools are essential. The rolls of right holders who helped to fight the fire, should be kept in record, so that the rights of defaulting right holders can be suspended.

**2.10.7.1.14. PREPARATION OF ANNUAL PLAN:** -Preparation of an exhaustive annual plan for the fire protection is also, recommended.

**2.10.7.2. ADMINISTRATIVE MEASURES: -**

(i) Administrative aspects are also very important in connection with fire protection efforts. Encouragement should be given to good staff, while negligent staff should be punished appropriately so that the officials remain vigilant and cautious in their work. The concerned Conservator of Forests, can give suitable reward, in case of exemplary work done by any official or any other person. So that temptation is more towards the fire fighting operations.

(ii) Regarding Government common land and other forests, which are not under the direct control of the forest department the D.F.O. should write to the revenue department authorities or the concerned authorities to take fire protection measures during fire season, as the fire gets spread in to Government owned forests, from these areas.

(iii) The D.F.O. should also make it known to the district revenue authorities that the staff and vehicles of the forest department should not be deployed for any work other than forest protection during fire season.

**2.10.7.3. LEGAL ACTION/PUNITIVE MEASURES:** -All cases of incendiarism should be properly investigated and punitive measures should be taken against the culprits. H.P. Govt. has framed rules regarding fire protection known as Himachal Pradesh Forests (Protection from fires) Rules, 1999 vide H.P.Govt. Notification No.FFE-A(C) 7-1/96-11 dated 17-11-99.

**2.10.8. ASSESSMENT OF LOSS CAUSE BY FIRE:** -Fire causes tangible and intangible damages to the forests and Wild Life. Loss of timber, resin, etc. is tangible, where as loss of soil fertility and soil constituent are intangible. Fire damage leads to increase in rate of soil erosion and causes drying up of water sources. Fire causes adverse effect on regeneration and destroys under growth leading to invasion by weeds. Natural succession goes into retrogression. Wild animals and birds are killed. Being afraid of disciplinary action, the loss caused by forest fire is often not actually recorded by field staff and is also under estimated because of which calculation of exact magnitude of loss is hardly possible. The offenders responsible for causing fire are also rarely caught and punished for which concrete and sincere efforts are required.

**2.10.9. FIRE RECORD:** -All cases of fires are to be registered with police for investigation and bringing the culprits to book soon after the outbreak of fire. The fire reports on prescribed proforma are prepared, immediately after controlling the fire, highlighting cause of fire, extent of area burnt and damage done, suggestions for the treatment of area and safe guards for future incidences. The fire reports

should contain a map of the area burnt. All the fire reports are sent to higher authorities and follow up action taken accordingly.

A complete record of fires will be maintained, both in Range, as well as in Divisional Offices. Maps of the forests showing the area burnt by fire will be filled in the compartment history files along with other relevant details regarding fire.

**2.10.10. KHOSLA COMMITTEE REPORT:** -The Govt.of India, vide No.A-34011/6/95-FF, dated 11<sup>th</sup>July 1995, from Sh. Sarveshwar Jha, Jt. Secy.,Ministry of Environment and Forests, constituted a team consisting of Sh. R.P.Khosla, IAS (Retd.) former Chief Secy., U.P. and former Secy., Ministry of steel, G.O.I., and Sh. S. Parmeswarappa, IFS (Retd.) former Pr.CCF., Karnataka to enquire into causes of forest fires, the extent of damage to forest wealth and to formulate a strategy to prevent the occurrence of such large scale fires in future and suggest measures for their control. The recommendations of the committee are attached as annexures in volume II.

**(B) 2.10.11. ILLICIT FELLING AND SMUGGLING:**

**GENERAL:** - With development of good network of roads, there has been an increase in incidences of illicit felling. The high price of timber in the market has attracted/created tendency to become rich overnight and hence the smuggling of timber takes place more than often. The illicit felling and smuggling are both related, many times organized. The incidences of smuggling have, however, reduced after the amendment in Indian Forest Act (H.P.2<sup>nd</sup> Amendment 1991) vide which DFO has been designated as Authorized Officer to hear the cases pertaining to illegal transportation of Govt. property i.e. timber, resin,khair-wood and katha and may order confiscation of forest produce, vehicle and tools involved in smuggling of said forest produce.The detail of Damage Reports issued and action taken for the last five years in Palampur Forest Division is as under in Table: 2.10.5.

**Table: 2.10.5. Showing status of Damage Reports as on 31.3.2010**

<b>Year.</b>	<b>Opening balance.</b>	<b>Damage Reports added during the year.</b>	<b>Total Damage Reports.</b>	<b>No.of Damage Reports Compounded</b>	<b>Balance Damage Reports.</b>
2005-06	46	62	108	51	57
2006-07	57	53	110	53	57
2007-08	57	108	165	89	76
2008-09	76	74	150	100	50
2009-10	50	88	138	133	5

Source: Palampur Forest Division.



The detail of cases admitted and decided in the court of Authorized Officer - cum - Divisional Forest Officer Palampur under 52A as on 31.3.2010 is given below in Table: 2.10.6.

**Table: 2.10.6. Showing status of vehicles under Section 52A of IFA**

Total cases.	Cases decided.	Balance cases under trial.	No of vehicle confiscated/rel eased.		No of vehicles under appeal/auctioned.	
			Owner	State Govt.	Appeal	Auctioned
21	17	4	13	5	1	4

Source: Palampur Forest Division.

### **(C) 2.10.12. ENCROACHMENTS: -**

**GENERAL:** -In recent year encroachment of forest land has emerged as a big threat to forest land. This is more so in Un-delimited Protected and un-classed forests. However in DPFs also the incidence of encroachment is not uncommon. Thus the boundary pillars of forests must be maintained regularly, if any shifting is noticed, action must be initiated immediately under IFA, 1927 and H.P. Public (Eviction of Un-authorized occupants) Act, 1971. All Divisional Forest Officers in H.P. have been delegated powers of Collectors under H.P. Public (Eviction of Un-authorized occupants) Act, 1971 in respect of forest land. All cases of such encroachments detected should be dealt with immediately as per procedure laid down. The detail of encroachment cases admitted and decided before the DFO – cum – Collector, Palampur Forest Division under H.P. Public (Eviction of Un-authorized occupants) Act, 1971 is as under in Table: 2.10.7.

**Table: 2.10.7. Showing status of Encroachment cases as on 31.3.2010**

Total cases.		No. of cases decided		No. of cases evicted		Balance cases of eviction.	
No.	Area in ha	No.	Area in ha	No.	Area in ha	No.	Area in ha
129	9.7591	129	9.7591	106	9.0414	29	0.7177

Source: Palampur Forest Division.

The balance cases for eviction are required to be taken up on priority by the field staff.

The detail of encroachment cases admitted and decided in the Revenue Courts in Palampur Forest Division under Land Revenue H.P. Public Act, 1954 is as under in Ta: 2.10.8.

**Table: 2.10.8. Showing status of Encroachment cases as on 31.3.2010**

Total cases.		No. of cases decided		No. of cases evicted		Balance cases of eviction.	
No.	Area in ha	No.	Area in ha	No.	Area in ha	No.	Area in ha
151	6.9845	120	6.2277	8	0.7568	143	5.4709

Source: Palampur Forest Division.

The position of cases under trial and eviction thereof before the Revenue Courts is unsatisfactory. This issue is required to be taken up with revenue authorities on priority.

The detail of encroachment cases received under Regularization of encroachment Policy of State Govt. in Palampur Forest Division is as under in Table: 2.10.9.

**Table: 2.10.9. Showing status of Encroachment cases under Regularization Policy of HP State Government as on 31.3.2010.**

Total cases received.		No. of cases evicted.		No. of cases challaned in the relevant court.		Balance cases for eviction.	
No.	Area in ha	No.	Area in ha	No.	Area in ha	No.	Area in ha
1490	209.6101	435	116.5267	Nil	Nil	1055	93.0834

Source: Palampur Forest Division.

As per order of Hon'ble Supreme Court of India, forest land cannot be diverted / allotted for non forestry activity without prior approval of Govt. of India. Hence suitable steps to evict the encroachers from the remaining forest land needs to be taken immediately.

#### **2.10.12.1. PREVENTIVE/REMEDIAL MEASURES: -**

(i) The forest officials must be well conversant with boundaries of the forests under their jurisdiction. The range officers, block officers and forest guards must check the boundary pillars frequently and in case of damage to boundary pillars, immediate legal action to punish the guilty and repair work should be undertaken on priority. DFO/ACF should also inspect the boundary pillars while inspecting forests, plantations and other forestry works.

(ii) The old stone masonry pillars should be replaced with cement mortar after proper demarcation. The new boundary pillars of only cement mortar should be constructed in future.

(iii) The field staff should be made accountable and sensitive towards the ever increasing menace of encroachments. The forest guard must initiate legal action as soon as the encroachment is noticed by him. He should chalk out the damage report and report the matter to range officer through block officer. The block officer should immediately seek demarcation and challan the case in the appropriate court. Range officer must act quickly to file the case in the court; the laxity at any level must be dealt with under CCS (CCA) Rules.

(iv) All the encroachment cases on forest land recorded as forest and in possession of Forest Department are within the jurisdiction of DFO as collector of the division under H.P. Public Premises and Land (Eviction and Rent Recovery) Act,

1971. Range officers should challan all such cases before collector or relevant court for speedy trial.

(v)The powers of carrying out demarcation are vested with the revenue officers under H.P.Land Revenue Act, 1954 and as such, many times, the demarcation of forests is delayed due to their pre-occupation. It is therefore, suggested that the Tehsildar, Kanungo who are on deputation with the forest department be delegated the powers of demarcation of forests to process encroachment cases expeditiously.

#### **2.10.12.2. STRATEGY:**

(i)Repair all existing boundary pillars and construct more boundary pillars close to habitation. For this areas need to be identified that are prone to encroachments.

(ii)As a deterrent, FIRs should be registered as soon as an encroachment is detected.

(iii)Latitude, longitude and altitude readings of all Boundary Pillars (old and new) to be recorded in the BP register and database in the Division office.

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## CHAPTER – XI

### THE INDO-GERMAN CHANGAR ECO-DEVELOPMENT PROJECT

**2.11.1. INTRODUCTION:** - The project region was located in the outer Himalayas, the “Shivaliks” in the lower catchment of Binwa and Neugal khad and upper catchment of Bathu khad covering an area of about 428 sq.km spreading over three civil sub-divisions of Distt Kangra mainly in the Changar area. In local language “Changar” means an area with rugged topography where there is acute scarcity of water. It is an area of naturally sensitive geology with instable soil profiles. Rapid geomorphologic changes have taken place in the Shivaliks for million of years. Natural erosive processes are accelerated by human uses. Increasing human and live stock population, deforestation and improper land use have resulted in steady degradation. Acute shortage of water from springs and seepages in hot dry months from April to June and fodder shortage for animals are the most pressing problems. Local people have reacted to the ecological problems. Majorities of the men are migrating to the fertile Palam Valley and north Indian plains in search of labour and jobs. The womenfolk and children are dependent on their remittances and meager yields of their marginal farms. Only 30-40 % of the basic needs are met from the privately owned lands. Most of the cattle graze on community and forestlands.

**2.11.2. SETTING:** - The IGCEDP was a multisectoral project, which had inter-disciplinary programmes to address the main socio-ecological problems of the area. It was started in 1994 and jointly implemented by GTZ (German Agency for technical co-operation) and the H.P. Eco-Development Society. Both the Govt. of H.P and the Govt. of Federal Republic of Germany provided funding. First phase of the project started from 1993 and ended in 1999 and 2<sup>nd</sup> stage culminated in the year 2006. The project had its head office at Palampur with four regional offices set up in the field at Mahakal, Andretta, Dheera and Jaisinghpur for effective implementation of the project.

**2.11.3. PURPOSE:** - The main purpose of the project was to reduce ecological degradation in the Changar area while improving the living conditions of the people. This purpose was to be achieved by making and strengthening the social village organisations (SVOs) in a manner so that these could maintain and manage their natural resources on sustainable basis.

The issue of sustainability can only be addressed by involving the local people, as they are the true decision- makers and managers of their own as well as community and government lands. The main thrust was on the improvement of land and water management with the help of various technical programmes in the

field of forestry, animal husbandry, soil & water conservation, agriculture and horticulture. The key lies in people's strong involvement throughout and intensive communication at all levels.

**2.11.4. APPROACH:** - The IGCEDP promoted participatory watershed management. The entire project area was divided into operational units called Mini-Micro Watersheds (MMWS). Each MMWS embraces 300-500 ha and four-six villages. Its main jobs were planning, co-ordination and implementation of watershed and other eco-development programmes in H.P. It was a three-layered organisation.

**2.11.4.1.** At the state level, it had a governing body whose main job was to frame the policy and evaluate the results obtained. It had both official and non-official members. The non-official members were nominated from the people of Changar area. The HODs of various departments like Forest, Agriculture, Horticulture, Planning and Finance were the official members of this body while Forest n Minister of H.P. as Chairman.

**2.11.4.2.** At the District level (middle layer) the project had a Co-ordination Committee in which all district heads of the departments mentioned in the Governing body constitution, project officials and 16 non-official persons of the project area were the members. The women represent half of the non-official members. This committee was headed by the Conservator of Forests Dharamshala Forest Circle. Main job of this middle level body is to establish linkage and ensure Co-operation between the project and the different departments already working in the project area.

**2.11.4.3** Last but not the least; the most important layer of the HPEDS was the Village Development Committee (VDC). It was constituted at the village level. Every VDC had its own executive body. The number of office bearers of an executive body varied from 9-12 depending upon the population of the village. The women folk constitute 50% of the executive body. The ward members of the Panchayat and Pradhan Mahila Mandal were the nominated members of executive body. Main job of this committee was to analyse their problems, to find out the solutions and implement the solutions on participatory basis with the help of IGCEDP and other departments already working in the project area. The management and maintenance of community resources also lie with the VDC.

**2.11.5. WORKING METHODOLOGY:** - IGCEDP was a multi-sectoral, inter disciplinary institution to address the main socio-ecological problems of the area and promoted participatory watershed management. The operational units were called mini micro watersheds (MMWS). The IGCEDP was implemented through the HPEDS which was an autonomous body for planning, co-ordination and implementation, therefore, its main thrust is on the improvement of land and water management with the help of various programmes in the fields of forestry, animal husbandry, horticulture, agriculture. After selecting mini micro water shed the

project authorities informed the village/villages of that MMWS as well as concerned panchayat and with the consent villagers the project started the following activities in that village step by step.

i) Hemlet level meeting :

The project officials visited each and every hemlet of a village. After introduction, they decided with the consent of the villagers the place and time of the next meeting.

ii) Village awareness meeting:

In this meeting which was held at a place and time fixed by the villagers during hemlet level meeting, the project officials gave full information to the people about the aim of the project, working methodology and the pre-conditions before execution of any work. The people agreed to the preconditions and showed their full agreement to work with the project and sent their agreement letter to the project authorities.

iii) Participatory Social Analysis(PSA):

After obtaining the agreement letter the project officials facilitated this exercise in the village and project officials carried out different analyses about their village. These included social mapping, wealth ranking and livelihood analysis etc. All the informations of that village regarding human and cattle population, literacy, fuel and fodder availability, already working institutions or departments etc were obtained by applying PRA tools.

iv) Visit :

After the PSA, the members of every caste from every hemlet of a village were taken on tour to visit such area where people had already carried out various eco-development works with the assistance of different institutions/departments. During this tour, the villagers learnt the art of making and strengthening their organisation (VDC) and carry out various eco-development activities with the help of various departments or other agencies.

v) Participatory resource analysis:

After the visit was over, the villagers their problems regarding forest, streams, hayland and agricultural showed land on a map. All the problems and their possible solutions were discussed in length with the villagers. Women's active involvement and participation sought in problems relating to natural resources because they were specifically involved in the use of natural resources. After discussion draft work plan was prepared for the village. This plan clearly depicted the problems, their causes, possible solutions how and when to implement the solution, people's participation etc.

The first activity, which finds mention in the draft plan, was implemented by the general house itself. The technical assistance if needed was only provided by the IGCEDP. The implementation of this activity helped in knowing the willingness

of the people to work together. The villagers showed proper cohesiveness, endurance and willingness while implementing the first activity and the technical staff of the project studied, analyse the draft plan with the villagers which ultimately resulted in to an Integrated Resource Management Plan (IRMP). An IRMP showed all the ingredients like Treatment map, intervention of technical staff and knowledge gained therefrom. The executive body was elected by the villagers from the general house. Main job of this executive body was to implement the IRMP with the assistance of IGCEDP and other institutions/departments working in the project area.

List of main activities carried out by the VDCs with the assistance of IGCEDP: -

- Soil and water conservation on Community lands.
- Development of water sources.
- Plantation of fuel, fodder small timber and fruit plants on private and Community lands.
- To increase green grass and leaf fodder.
- Raising of Community orchards.
- Disposal of scrub cattle from the project area to the Gosadan.
- To arrange technical tours to the villagers regarding animal husbandry, agriculture, horticulture and other activities relating to farming system.
- To train and develop local expertise in animal husbandry, agriculture and horticulture.
- To organise farming training camps to provide technical know how to the farmers in the fields of forestry, agriculture, horticulture and animal husbandry.

Pre- Conditions: -

- The project worked with the well-organised VDCs only.
- Every household had to contribute towards village development and maintenance of all Community assets created or replaced.
- The project gave top priority for the development of Community resources.
- All the members of the VDCs should not graze their cattle in the planted area.

- Every household was supposed to participate. It could be in any shape cash, kind or labour.

**2.11.6. APPROACH TO COMMUNITY FOREST MANAGEMENT:** - Forests whether managed as pure crops, mixed the plantations or agro-forestry have a paramount role to play in effecting soil conservation, restoration of degraded areas through enhanced productivity and biodiversity. Moreover, about 65% of the operational area of the changar project was potentially available for initiating eco-restoration and multipurpose community forestry.

**2.11.7. THE EFFORTS:** - The experience made by IGCEDP had proved that the community mobilization and sustainable forest management can not happen at their own unless the capacity building and empowerment of communities is not well conceived, affected and technically backed up. The technical aspects of community forest management have earned significance not only due to people's demand and interest in short-term benefits out of such plantation but also due to the fact that in H.P. the experience of managing mixed forest and multilayered vegetation is limited. Therefore, IGCEDP had taken up the task of turning community forestry in to a needful filling economic and ecological option. The key objective of forestry in Changar was a long-term eco-development integrated with the regular flow of multiple products needed by local communities and enriching local livelihoods in the process.

**2.11.8. THE PROCESS:** - The process which leads to actual planning implementation and management of a plantation came out of the Village Integrated Resource Management Plan (VIRMP). The VIRMP emerged from the amalgamation of people's knowledge and project's expertise. This document was the basic plan for the sustainable natural resource management. The ground work for plantation activity was done through Participatory Resource Appraisal (PRA) transect (Survey of plantation site and approximate plan with the villages) and issue based workshop.

Once a Community had decided for a tree plantation for achieving perceived benefits (e.g. leaf fodder, grass small timber etc) the approximate tree species combination was selected with the villagers. The land use map with contours based on revenue map was prepared for VIRMP. The proposed area of containing plantation was depicted by the people on this map. The part containing plantation site was delineated and enlarged to a required size and used in the field to design the plantation map. This was followed by the plantation site visit with the villagers and adjustment of people's choice of tree/plant species to the given site conditions. The plantation site gets divided in to blocks as per stages of degradation, upper soil features and growth elements like grasses and other bushy growth. The plantation map became the part of the plantation Journal as well, which contains the implementation, management and participatory evaluation details of the same.



**2.11.9. SUSTAINABLE MANAGEMENT:** - The plantation management guidelines discussed and developed with the local Community were consolidated in to Community Forest Management Plan (CFMP) which consist of

- (i) Operational rules
- (ii) Collective decision making rules
- (iii) Constitutional rules
- (iv) Memorandum of Understanding.

The role of the local Community and that of the project was elaborated. Similarly, the role of future participative and back stopping stakeholders was also elaborated (e.g. Forest Department). Along with the plantation map, the foreseeable technical management and yield plan based on the delineated blocks was attached. For the long term and sustainable management of plantation the IGCEDP envisaged the inclusion of such plans in to the Forest Management Working Plans of the Forest Department. The Community Forest Management Plan was based on the updated rules and regulations of H.P. Joint Forest Management Act of 1993.

**2.11.10. ADVANTAGES: -**

- CFMP with its contents will go along way in capacitating and empowering the local Communities for the technical management of multipurpose plantation.
- It will provide baseline for the forest department to act as facilitator for a long term supervision and technical guidance.
- CFMP will serve as monitoring and evaluation tool not only for local communities but also for the facilitating stakeholders, (Forest Department) in giving timely professional inputs to various aspects of forestry.
- If user groups and their rights are determined and depicted in CFMP, this will help in facilitating equity and transparency when intermediate and final yields are harvested.
- CFMP will go long way in practising site and situation specific multipurpose forestry fulfilling productive and protective criteria.

**2.11.11.ACTIVITIES OF THE PROJECT:-** During the First Phase (1994-99) the project had covered 277 villages of 67 Panchayats and an amount of Rs. 22.35 crores (Rs. 10.35 crore by H.P. Govt. & Rs. 12.00 crores by the Federal Republic of Germany). In the 2<sup>nd</sup> Phase H.P. Govt. provided Rs. 10.00 crores and German Govt. share was up to Rs. 20.00 crores. The details of physical achievements made during the Phase-I and II are as under in table: 2.11.1

**Table: - 2.11.1. Detail of Physical Activities Achieved**

ACTIVITIES	UNIT	ACHIEVEMENTS	
		PHASE-I	PHASE-II
1	2	3	4
(1) Social development & extension.	No.		
(i) Village Awareness Meetings.	-do-	411	287
(ii) IRMP / Village Action Plan.	-do-	190	156
(iii) VDC formation.	-do-	250	63
(iv) VDC Registered.	-do-	102	63
(v) General House Meetings.	-do-	805	-
(vi) VDMF opened.	-do-	88	196
(vii) CBO strengthened.	-do-	345	-
(2) Plantations.	Ha.		
(i) Community plantations	-do-	1505.50	439.65
(ii) Hay land plantations.	-do-	445.00	279.20
(iii) Vegetative Measures.	No.		
(a) Bamboo Rhizomes.	-do-	8342	9438
(b) Others Measures.	Rmt.	21381	27908
(c.) Mango-in- situ (pits).	No.	29078	-
(iv) Engineering structures. (C,Dams, R.Walls, & Spurs etc.	-do-	2074	3037
(3) Soil and Water Conservation.			
(i) Repair of existing structures.	No.		
(a) Bouri.	-do-	185	175
(b) Well.	-do-	15	18
(c.) Community Tank.	-do-	32	6
(d) Diggi / Naun.	-do-	2	12
(e) Farm Ponds/kuffars.	-do-	44	12
(f) H.Walls.	-do-	16	3
(h) Kuhl/floe irrigation schemes.	Rmt.	44	-
(ii) New construction.	No.		
(a) Bouri.	-do-	145	170
(b) Well.	-do-	4	11
(c.) Community Tank.	-do-	43	14
(d) Diggi / Naun.	-do-	4	-
(e) Farm Ponds/kuffars.	-do-	15	7
(f) H.Walls.	-do-	49	13
(g) LIS.	-do-	2	-
(h) Kuhl/flow irrigation schemes.	-do-	67	-
(iii) Water harvesting Tanks.	-do-	268	79
(4) Agriculture.			
(i) Composting Pits	No.	5293	-
(ii) Demonstration plots.	-do-		
(a) Vegetatable	-do-	636	-
(b) Catch/cash crops	-do-	558	-
(iii) Fodder production programme on private land.			
(a) Raising and distribution of seedlings.	-do-	46604	48161
(b) Raising and distribution of grass tufts.	-do-	784280	504525
(iv) Fodder Production Programme (Plots).	-do-	396	468

(5) Horticulture.			
(i) Homestead Horticulture.	No.	77074	44915
(ii) Orchards	-do-		
(a) Individual.	-do-	242	2525
(b) Community.	-do-	16	6
(c.) Garden colony	-do-	30	-
(iii) Demonstration for existing orchards.	-do-	103	-
(iv) Top working.	-do-	233616	6320
(6) Animal Husbandry.	No.		
(i) Stall feeding promotion programme.	-do-	1470	-
(ii) Transportation of animals to Go-sadan.	-do-	2090	759
(iii) Veterinary camps.	-do-	47	15
(iv) Follow-up-camps.	-do-	45	-
(v) Natural services.	-do-	7290	-
(vi) A.I. Services.	-do-	4010	-
(vii) Progeny born:	No.		
(a) Male	-do-	1503	-
(b) Female	-do-	1775	-
(7) Small help activities.			
(i) Construction of foot path/fire lines.	Rmt.	44600	-
(ii) Construction of crematoria area.	No.	41	-
(iii) Repair of crematoria Bhati	-do-	11	-
(iv) Construction of community center.	-do-	6	-

Source: Palampur Forest Division.

Out of total of 593 villages, the Project operated in remaining 274 villages, except 42 villages, which were under NWDP implemented by Agriculture department.

#### **2.11.12. IMPACT/EXPERIENCES OF THE PROJECT IN COMMUNITY FORESTRY:**

Broadly experiences of the Project in Community Forestry can be grouped under 4 major sub heads which are described as under: -

##### **2.11.12.1. Social / Institutional :**

- Initial response of the village Communities towards afforestation on the forest and Community land was lukewarm. It was very difficult to get a general consensus in the village so most of the plantations remained to be project's agenda. However in villages where facilitation was adequate and proper plantations had proven successful.
- The sensitization, capacity building and empowerment of village level institutions e.g. VDCs in major social and forestry aspects were of great significance and can strengthen the Village Development Committee for other issues of Natural resource management.

- Participation or contribution cash or kind of local Communities towards forestry work was very low. This was because of the fact that live stock keepers had to look for fresh grazing land, benefits were seldom-short term and many users were skeptical about the impact.
- The trust of the people in the multiple benefits of a plantation is easily lost if plantation does not establish. Plantations in which people were involved from the beginning were usually better.

#### **2.11.12.2. Technical:**

- Mortality rate is very high and growth of plantation is hampered if not accepted by the Community.
- Plantation closure both on Shamlat and Kharetar immediately increases grass production but gets reduced by year no.5 if tree density has increased.
- Die back of the main species (Khair & Shisham) is a big problem and reduces the survival while growth is reduced.
- Technical knows how of the field staff i.e. Forest guard and Deputy Ranger in various forestry projects are poor.
- Grazing is a practice, which will take a long time to cease, but it can be controlled.

#### **2.11.12.3. Ecological :**

Plantation if raised with good technical standards and protected by the villagers during initial years are the most effective and cheaper tools for rehabilitation of natural regeneration, biodiversity soil conservation and water recharging.

#### **2.11.12.4. Economical:**

Forestry can prove to be of great interest economically. The need of the hour is multipurpose forestry, proactive silviculture and flexible usufruct sharing and regular yields. Focus has to be on value addition. The established plantations are already showing good potentials of various products and activities.

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## CHAPTER-XII

### THE MISCELLANEOUS REGULATIONS

**2.12.1. ROADS & PATHS:** -Palampur Forest Division has a very good network of all weather roads, which includes National and state highways and other roads, which are maintained by P.W.D. and Forest department. Motor able roads except few in Palampur can visit majority of the forests and Baijnath ranges. Hence there are no proposals for new roads in near future except for bridle/inspection paths. Need for maintenance of these roads and paths can not be overemphasized. Adequate funds to maintain these roads/paths should always be made. These forest roads and paths, if kept clear and well maintained serves as fire-line and means of transportation, therefore, expenditure on their maintenance will be amply allotted. The condition of most of these is very poor and require extensive repair. The Divisional Forest Officer, depending upon the availability of funds, may decide priority for the repair works. The following bridle/inspection paths are proposed to be constructed during the plan period in Table: 2.12.1.

**Table 2.12.1.Bridle/Inspection paths Construction Programme:**

Sr.No.	Range	Bridle/Inspection Path.	Particulars	Approx. Length In Kms.
1	2	3	4	5
1	Palampur	Bridle path	Ghamrota to sukeri	2.00
2	-do-	Inspection path	Thalla to Lunani	3.5
3	-do-	-do-	Darognu to Dehlru	3.00
4	Baijnath	Bridle path	Malghota to Bhadrena	6.00
5	-do-	-do-	Kangnu-ka-proh via simble to Drug.	7.00
6	-do-	-do-	Drug to Jhamrella	3.00
7	-do-	-do-	Tar to Jalsoo jot	20.00

**2.12.2. BUILDINGS:** -The condition of the residential buildings for field staff is poor and requires special attention for their repair. The buildings which are in bad condition and can be made livable by carrying out special repairs are prescribed to be taken up at priority after the personal inspection of the D.F.O. Efforts should be made to procure the funds for the repairs, so that the field staff is comfortable at their head quarters.

**2.12.2.1.**The construction of following new buildings is suggested during this plan period. The order of priority may be decided by the Divisional Forest Officer, under the direction of his C.F. and subject to provision of budget: -

**Table: 2.12.2. Buildings Construction Programme**

Range	Sl.No.	Particulars of Building	Location
1	2	3	4
Bajjnath.	1.	Block Officer Residence.	Bajjnath
	2.	-do-	Deol
	3.	Forest Guard Hut.	Sakri
Daroh	4.	-do-	Harsi
	5.	-do-	Balota
	7.	-do-	Sanooohn
Palampur	8.	-do-	Jia
	10.	-do-	Kushmal
	12.	-do-	Bandla
	13.	-do-	Kandi
	14.	-do-	Maranda
	15.	-do-	Panaper (Balla)
	16.	-do-	Naura
	17.	-do-	Kahanpat (Balla)

**2.12.3. WATER SUPPLY:** -Most of the existing buildings and residential buildings situated in the interiors lack regular water supply. Provision should be made for providing this facility, as considerable time and energy is wasted on carriage of water from far off places. Hence efforts should be made to make the drinking water available by getting proper connection from I& P.H. Department at personal level.

**2.12.4. PETTY FELLINGS:** - Minor fellings, the produce of which falls in low limits are counted towards petty fellings and also one from the following listed purposes, allowed on silvicultural considerations by the Divisional Forest Officers. All such removals should be accounted for in control forms and recorded in compartment history files.

- (i) Dry, Fallen and fire damaged trees occurring scattered in forests for ordinary departmental uses or for other Government departments.
- (ii) Trees required for the bonafide timber requirement of local villagers i.e. free grantees and the right holders.
- (iii) Trees required to meet special free grants where property is destroyed due to the natural calamities, as per provisions of the Government orders.
- (iv) Trees falling under alignments of transmission lines, roads and other development projects.
- (v) Trees required for research by the silviculture division of the department, universities or Forest Research Institute and Indian Council of Forestry Research and Education and also else where.
- (vi) Other departmental uses, such as temporary construction of bridges, Charcoal manufacture etc.

**2.12.5. DEVIATIONS:** - All fellings not covered by the provisions of this plan will constitute a deviation. Sanction for all deviations from the prescription of the Working Plan shall be obtained from the competent authority well in time. The salvage markings be however, carried out as per instructions. As per latest instructions regarding salvage marking, issued by the Pr.C.C.F. HP only fallen and dry trees are to be counted as salvage.

**2.12.6. SURVEY, DEMARCATION AND SETTLEMENT:** -An area of about 1,162 ha of a private forest, Nagban, of erst-while Lambagaon Jagir has been vested with the Government under the provisions of the H.P. Ceiling of Land Holdings Act, 1972 and has been handed over to the Forest Department for management. But the same has not yet been converted into D.P.F. during the recent Forest settlement operations being carried out in Palampur Forest Division. Immediate necessary step be taken to convert this forest area into Demarcated Protected Forest. The condition of the Boundary Pillars is not very satisfactory. In some forests the Boundary Pillars constructed during the recent past are in better condition, but their numbering, forward and backward bearings are not carved, which creates confusion. In many of the forests, where the boundary of forests adjoins private lands or have cultivated lands known as "Private chaks", most of the boundary pillars are found missing. Also in forests having large extent of the area, the distance between the consecutive pillars is very large, which creates confusion about the alignment of boundary. In both of the cases smaller (intermediary) boundary pillars at short distances be erected.

The survey sheets on 1:15,000 and 1:50,000 by Survey of India are available. The 1:15000 sheets depict the position of boundary pillars, though numbers are not given in most of the cases.

**2.12.7. MAINTENANCE AND CHECKING OF BOUNDARIES:** -It was observed during the traversing of boundaries, that majority of the pillars are either missing or its location do not conform to that shown on Survey sheet. Regarding the extent of the forest area, the extent depicted in survey sheet do not tally with the actual area on the ground. The Un-delimited Protected and Un-classed forests need demarcation. The nautors/included cultivations be properly demarcated and delineated on the ground by erecting chak pillars. Therefore collector (Forests), Palampur or competent revenue authorities be requested to demarcate all the U.P.F's, U.F's, boundary pillars/included cultivations/nautors on ground and ascertain their exact location as well as extent. Bearing of all the boundary pillars be recorded and serially numbered. One fifth number of boundary pillars should be checked annually and boundary register corrected where required. Following points should be kept in mind while maintaining boundary pillars.

(i) Distance between consecutive boundary pillars, forward and backward bearings should tally with boundary register/beat manual.

(ii) Visibility of successive boundary pillar be made by clearing the boundary line carefully.

(iii) Number and both bearings be engraved on to the boundary pillars while executing fresh construction or repair.

(iv) Boundary distinction between compartment/Sub-Compartment be made clear by putting white paint belts on trees.

(v) The boundary registers are not maintained in most of the beats, but at the same time some valuable old record is available in few of the beats, which is in poor condition. Direction should be issued to re-construct the old available information/ record afresh, without further delay.

(vi) U.P.F's and Un-classed forests in this division are not properly demarcated and due to this reason, most of the field staff does not know their status, extent as well as location, which leads to encroachments by the local villagers.

It is suggested that boundary pillars should be erected after proper demarcation, adhering to the standing orders issued by the Pr.CCF/HP, vide order No.1/2000 dated 4-3-2000 regarding "Demarcation and settlement operations in Himachal Pradesh- specifications for Boundary Pillars", which contains complete details regarding specifications, procedure for construction of boundary pillars, analysis for construction of boundary pillars, designs etc.

**2.12.8. BAN-MUAFI FORESTS AND VILLAGE COMMONLANDS:** -The ban-muafi forests and the village common lands which were owned by the village community/Panchayats have vested in the Government under the provisions of the "H.P. Village Common Lands (vesting and utilisation) Act, 1974." The ban-muafi forests contains good forest crop of chil. Some village common lands (shamlats) areas also carries miscellaneous broad-leaved forests. An area of about 4,850 ha. of the village common lands have been vested with the Government under this act. About half of such area in each village was to be kept as allotable pool, for allotment to the landless and other common purposes. The remaining areas were to be handed-over to the Forest Department for management as forests and entered in the Revenue records as such. This is yet to be done and notified as Protected Forests under Indian Forest Act, 1927. At present it is not possible to regulate or prohibit any acts in these areas because these have not been demarcated as per prescribed procedure and then notified as Protected Forests. This aspect should receive immediate attention at the levels concerned.

In addition there are a large number of plantations carried out on common lands under various schemes, v.i.z. Soil Conservation and Social Forestry schemes, in the past. These successful plantations are mostly of chil and are now in pole stage and beyond. In order to bring these under scientific management and include them in the preview of the Working Plan it is necessary to notify these areas as D.P.F.'s. Steps to initiate action for their notification as Protected Forests may be taken up at the earliest.



**2.12.9. FIXING OF COMPARTMENT BOARDS AND PLATES:** -It was observed during field visits that the knowledge of the field staff about various forests/ compartments and allotments there of is very poor. It is therefore laid down that small tin plates (approximately 20x15 cm size) should be fixed on the trees along the boundary of the forests/ compartments, depicting the name, number, area, compartment, Sub-Compartment and allotment. In case of PB-I areas, felled coppice areas, as well as the plantations raised as per prescription of the plan, the signboards of bigger size (approx.60x90cm) should be fixed.

**2.12.10. METEOROLOGICAL DATA:** -Due to non-maintenance of rain gauges installed in the past in this division all these have become out of order and no record of rain fall/temperature is now available. These should be got replaced and data collected as per prevailing instructions. Keeping in view the importance/ role of rain, temperature and wind over forests and forestry works and that there is not much data available regarding temperature etc., it is suggested that rain gauges, wet and dry thermometers and instrument to measure wind speed and direction should be installed at each range headquarter and proper recordings and compilations should be done. The work will be monitored quarterly by R.O concerned and annually by D.F.O. The data should be compiled on monthly basis and properly evaluated at Divisional level.

**2.12.11. FIRE PROTECTION:** -Forest fires, specially the young crop, affect usually large areas of Chil forests. Therefore, the chil forests covering a large area in this division need special attention for fire protection. Other forests species viz. Deodar, Fir, Spruce, Oaks etc. are though fire tender, but fires in such forests are not very common, therefore, damage is not of much significance. Detailed instructions in the matter as contained in H.P.Forest Manual Vol.-IV, for fire protection should be strictly adhered to. In addition, further details are given in **Chapter-X on “Forest Protection (overlapping) Working Circle”**.

**2.12.12. MAPS:** -Two sets of stock maps showing necessary details for each forest on 1:15000 scale and regeneration survey maps on 1: 3,960 scale have been prepared and appended in respective Compartment History Files. Three sets of Administrative, Management and Fire maps have been prepared on 1:50,000 scales. These should be mounted and hung in the office of D.F.O, as well as of Range Officer. The stock maps always be updated by depicting major changes such as roads, bridle/inspection paths, and buildings etc. if any. These maps have been handed over to the DFO (T) Palampur.

**2.12.13. COMPARTMENT HISTORY FILES:** -The Compartment History Files have been brought up to date. These should be posted regularly in all respect.

**2.12.14. GRANT OF TREES TO RIGHT HOLDERS:** -Timber distribution has to be done strictly in accordance with the provisions of the Forest and Land Revenue Settlements new Timber Distribution Policy notified by the HP State

Government. A more care should be exercised on marking of trees and the executive instructions issued by the competent authority from time to time for right holders and proper check should be made regarding misuse and pilferage of timber granted. In some of the forests of Baijnath Range, Deodar is present, either in natural regeneration or through plantations, granting of these to the right holders should be strictly discouraged.

**2.12.15.LOPPING:** -The lopping of Chil and Ban Oak has been indiscriminate especially near habitations. The regeneration in the form of pole is heavily lopped which affects the growth adversely. Indiscriminate lopping should be discouraged and stopped.

As per lopping rules, no tree less than 45 cm in girth can be lopped, the branches cut should not exceed the thickness of fore finger. Branches of trees above the upper half of the crown height should not be lopped. As far as possible lopping should be allowed in one portion of the area and close the other in a season. In the next season the open area should be closed and lopping allowed in other portion, which remained, closed in the previous season. Thus through rotational lopping the wounds of trees are not only healed up but more foliage is also available. It is felt that the rules regulating the exercise of lopping rights are adequate, but enforcement is generally lacking. Lopping rules have been discussed in detail in **Chapter 3 Part-2 Para 2.3.15.4 and Chapter 5 Part-2 Para 2.5.13.12.** All sincere efforts are to be made to enforce these rules strictly.

#### **2.12.16. WIRELESS COMMUNICATION/CELL PHONES AND TRANSPORT SYSTEM: -**

**2.12.16.1.** With a view to ensure effective control on the movement of forest produce in Himachal Pradesh, a wire less communication system was planned in 1992-93 and in the 1<sup>st</sup> phase 42 stations were made operational in 1993-94 throughout the state. All wire-less station established so far are operated on a single frequency (i.e. 159.900 MHZ). Now with the introduction/establishment of very good mobile technology network in the State, the wireless communication system has become redundant. It is suggested that for an effective control of fire all forest officials including Forest workers needs to be allowed a mobile allowance in the fire season. In addition to the existing system it is also suggested that all Range offices should be provided with telephone facility to have effective and proper contacts with the public.

**2.12.16.2.** At present transport facility at Range level is lacking. The field staff is experiencing great difficulty during fire season and specially dealing with timber smugglers. Therefore, it is suggested that a Utility van should be provided to each Range office to be used in such exigencies as well as other regular forestry operations. This aspect needs immediate attention at concerned level.

**2.12.17. REGENERATION ASSESSMENT SURVEY:** -Regeneration assessment in the forests gives a clear/actual picture of forest stocking, which plays a vital role in the management of forests. It is suggested that regeneration

assessment survey of coppiced and PB-I forests should be regularly carried out every year. This can be of great help of and should be kept in view while preparing the A.P.O. for next year. The regeneration should keep pace with the fellings/removals. And in case of variations corrective measures should be taken by resorting to artificial regeneration/closure, so that the area is restocked in prescribed time.

It is observed that during the implementation of previous plan, no such survey was conducted. During the year 2001, regeneration survey in few of the forests was conducted in compliance to the Hon'ble Supreme Court orders 202/95-96 dated 22-9-2000.

**2.12.18. NAUTORS:** - Nautors are granted under the provisions of settlement and rules framed thereunder. It is worth mentioning here that if necessary these should be granted from allotable pool of village common lands only and not from notified forest area. Pillars to avoid encroachment on the Government land should define boundary of each nautor.

**2.12.19. ENCROACHMENTS:** - All Divisional Forest Officers in H.P. have been delegated powers of Collectors under H.P. Public (Eviction of Unauthorized occupants) Act, 1971 in respect of forest land. All cases of such encroachments detected should be dealt with immediately as per procedure laid down.

**2.12.20. RIGHTS IN THE PROTECTED AND UN-CLASSED FORESTS:-**A number of rights have been admitted in the protected and un-classed forests at the time of revenue and forest settlements. Many of these rights were granted to the villagers on account of their being co-proprietors of the soils of these forests. With the vesting of the ownership of the soil of these forests in the government, they are no more proprietors of the soils. In view of this, some of the admitted rights cease to continue; For instance, rule 26, applicable to the protected forests of this division, is reproduced as under: -

“The proprietors of the soil of the Protected Forests may, as such, remove from the area of which they are proprietors, dry fallen wood fit only for fuel.”

Since the villagers are no longer proprietors of the soil of Protected Forests, the right of taking dry, fallen wood has become invalid. This aspect needs to be examined and necessary corrective measures taken, if deemed necessary.

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## CHAPTER-XIII

### CONTROL AND RECORDS

**2.13.1. COMPARTMENT HISTORY FILES:** -Two copies of the compartment history files (one each for the Division and Range), have been prepared for all the Reserved and Protected forests of the division. Compartment History files for thirty three newly notified D.P.F.'s have been prepared denovo. Effort has been made to tag the old record, where-ever available, with the new compartment History file. Stock maps on 1:15,000 scale, forest-wise (for the whole forest) have been appended in all Compartment History files along with the management prescriptions and enumeration results.

The past record of maintenance and posting of Compartment History files has not been satisfactory. It is, therefore, emphasized that the compartment history files be posted regularly and accurately, under the supervision of the DFO/ACF. The inspection notes of the DFO, CF and other Superior Officers be tagged properly in the concerned compartment history file. The works being done in the forest areas under various schemes and projects, even by agencies other than Palampur Forest Division e.g. Dhauladhar and Changer Projects should also be included in the Compartment History files. The DFO is required to submit a certificate to CF, along with the control forms, that all compartment history files have been brought up-to date. The DFO is advised to make a special mention regarding the updating of this record during the Range Inspections.

**2.13.2. CONTROL FORMS:** -In order to exercise proper control over the observance and implementation of prescriptions and suggestions of the Working Plan, the DFO shall submit the control forms 2a, b, and c compartments out-turn and miscellaneous regulations etc., on the prescribed format to the CF, on an annual basis, without fail. These control forms have been standardized and, as given in the "Code for Working Plan Procedure" and have been appended with the respective Compartment History Files for maintenance of these records for each Compartment/Sub-Compartment.

**2.13.3. PLANTATION AND NURSERY JOURNALS:** -In order to have complete information on plantations done in any area other than those covered by a compartment history file i.e. outside DPF and UFs, separate plantation journals incorporating details regarding year and month of planting, species planted, cost of different operations, survival beating up, maintenance activities, shall be maintained and posted regularly till the plantation is beyond danger. A map of the plantation, along with boundaries and legal status of the area and its physiography should also be appended. In the event of failure of any plantation, specific reasons for the same are recorded therein. The field officers should also make a note of their observations during their tour/visit to the plantation. These journals should be maintained at the Range level.

Similarly Nursery journals should be maintained at Range level that shows the complete record about the origin of seed, date of sowing, germination, cost of various operations and stock position. The cost of raising the plants be entered at the end of each season in this journal. Reasons and observations for good/ bad results be incorporated for further reference and record.

**2.13.4. FOREST GUARD MANUAL (BEAT BOOK):** - The importance of this manual to the concerned forest guard for proper control and efficiency cannot be over emphasized. These require to be standardized for the whole division and these should be got printed. Information on the following aspects must mandatorily be available in a beat book.

- (a) List of forests in the beat along with their area and allotment in the Working Plan. It should have sufficient space for further allotments in the event of revision of the Working Plan.
- (b) Map of the beat, showing the various forests, maps of the different forests in the beat traced from the respective compartment history files, showing the boundaries of the Compartment, Sub-Compartment, boundary pillars, roads, paths etc.
- (c) Copy of the boundary register of each forest in the beat.
- (d) Extracts of important Acts, and notifications relevant to a Forest Guard.
- (e) Duties of the beat guard
- (g) Range Officer's standing instructions.
- (h) Details of PB-I areas, if any, in his beat.
- (i) List of plantations raised with space for updating.
- (j) Class-wise volume and market rate of important timber species.
- (k) Names, addresses and telephone numbers of important/ resourceful persons/ institutions in the beat.
- (l) Record of habitual offenders.

This will update the knowledge of the beat guard and help him discharge his duties effectively and efficiently. The Divisional Forest Officer shall ensure that all the beat guards are supplied with the beat book and maintained properly. Handing over the charge of the beat, in the event of transfer, will be smooth and orderly and important information will not be lost. The Range Officer should insist on checking the beat book once every month on the payday.

**2.13.5. DIVISIONAL NOTE BOOK:** -This book is maintained for the use and guidance of Divisional Forest Officer. The divisional note book properly maintained is of great assistance to the DFO as it helps him/her by providing information on a variety of subjects of day to day working e.g. experiments, methods of estimating out turn, trends of prices of various forest products, prices/auction of timber/trees, status of court cases under Section 52 A of IFA and P.P.A. etc.

**2.13.6. RECORD OF MACHINERY:** -These registers should be maintained to keep a record of all vehicles, machinery etc. incorporating the year of purchase/ receipt, initial cost, repairs done and its cost, other relevant details etc.

**2.13.7. FIRE RECORDS:** -A record of fires in the division shall be maintained in accordance with the instructions issued from time to time.

**2.13.8 REGISTER OF ROADS, BUILDING, PATHS, FIRE-LINES ETC.:** - These should be maintained Range wise, mentioning the year of construction, cost incurred, plinth area, length of road, path. All works under capital expenditure should be incorporated in this register and this should be updated yearly.

**2.13.9. REGISTER OF REGENERATION ASSESSMENT SURVEYS:** - The details of various regeneration surveys carried out as per the prescription of Working Plan should appear in this register that should be maintained on the prescribed proforma. The compiled annual report of such survey conducted will be conveyed to DFO by concerned Range Officer.

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## CHAPTER-XIV

### ESTABLISHMENT AND LABOUR

**2.14.1. ESTABLISHMENT:** - The position of staff as per sanctioned strength and existing strength on 31.3.2010 has already been tabulated in **Para 1.4.1 of Chapter IV. (Part-I)**. The rapid pace of development and increasing human population has put immense pressure on forestland and wealth. There is an increasing thrust on construction of roads and erection of transmission lines. At the same time the demand for timber for improved residential houses by locals has also seen an upward trend. The vigilance and protection of forest wealth should therefore be intensive than extensive. It is therefore suggested that for effective and intensive working vacant positions of staff are required to be filled immediately.

**2.14.2. CREATION OF NEW RANGE:** - With the final notification of Dhauladhar Wildlife Sanctuary entire area of Bir Range has been excluded from this working Plan and handed over to the Wildlife Wing of H.P Forest Department for better management from wildlife angle. Hence it is suggested to revive/carve out Jaisinghpur Range with headquarter at Jaisinghpur from Droh and Baijnath Ranges.

**2.14.3. LABOUR:** -The matter regarding availability and supply of labour for various types of operations has been discussed in detail in **Chapter-IV (Part-I)**.

As mentioned in Chapter IV, labour engaged in Resin tapping and timber extraction works, is generally imported from other districts of the state by contractors, due to their skill in these works. These skilled workmen are generally paid at higher rate as compared to the government daily wage rates. To meet with the scarcity of labour D.F.O. should frame a schedule in such a way that the services of recently regularised daily wagers are used in systematic way so that the seasonal works of forestry schemes are not hampered for want of labour. The distribution should be done in such a way that each range has proportionate number according to the working targets. While engaging daily wagers or regularising them the detailed instructions issued by govt.vide PER (AP-II)'B (2) 5/86-III dated 11-7-95 be kept in view.

**2.14.4. TRAINING:** - Functioning of Forest Department now has more role of people's participation. Execution of various schemes and projects is now being done through locally constituted VDCs under participatory approach. Therefore, a skill is required to convince the people and to get scheme implemented in a successful way. For which short term training courses are being run at Forestry Training Schools and Dr. Y.S. Parmar University of Horticulture and Forestry. Therefore it is proposed that different category level staff be rendered training from these institutions.

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## CHAPTER-XV

### FINANCIAL FORECAST AND COST OF THE PLAN

**2.15.1. GENERAL:** -Due to all round development of the region, rise in the living standards of the people and improvement in the means of communications, the prices of the forest commodities have registered a steep rise during the past years. This trend is likely to continue in the future also. Therefore, the usual fluctuations, made it very difficult to prepare a financial forecast that is likely to be accurate for the whole period of the plan. Similarly, it is equally difficult to correctly assess the expenditure likely to be incurred in carrying out the prescription of this Working Plan. An attempt has therefore been made to estimate the future surplus based on the current price of the forest produce and the present cost of carrying out various operations prescribed in the Working Plan.

**2.15.2. PAST YIELD:** -The details of yield from various working circles realized in the past are given in **Chapter VII (Part-I)** of this plan.

**2.15.3. PAST REVENUE AND EXPENDITURE:** - The details regarding past Revenue and Expenditure is given in **Table:1.3.26, Para 1.3.12 of Chapter III (Part-I)** of this plan.

**2.15.4. FUTURE YIELD:** - The annual expected yield of different species in each working circle is given in Table 2.15.1

**Table 2.15.1. Showing Annual Prescribed Yield**

S.No	Working Circle	PB	Average Annual prescribed yield.
1	2	3	4
1.	Chil Working Circle	<b>F S-I:-</b> (i) PB-I (ii) PB-IV <b>F S-II:-</b> (i) PB-I (ii) PB-IV <b>F S-III:-</b> (i) PB-I (ii) PB-II <b>Total:</b>	1,500 cum. 2,000 cum.  500 cum. 400 cum.  400 cum. 600 cum. <b>5,400 cum.</b>
2.	Plantation Working circle.	By area.	130 ha.
3.	Protection-Cum-Rehabilitation	-	No yield prescribed
4.	Ban-Oak Working Circle	-	No yield prescribed



### 2.15.5. FUTURE REVENUE AND EXPENDITURE: -

**2.15.5.1. REVENUE:** -Based on current market prices, the anticipated annual revenue is provided in **Table 2.15.2** below:

**Table: 2.15.2.Anticipated Annual Revenue of Palampur Forest Division.**

Sl.No.	Produce	Expected annual yield M <sup>3</sup>	Rate (Rs.)	Amount in Rs.
1	2	3	4	5
1.	Royalty of standing Chil trees	5,400 M <sup>3</sup>	572/-cum.	30,88,800/-
2.	Royalty from coppice coupes.	130 ha.	11,000/- ha.	14,30,000/-
3.	Royalty of Resin blazes	50,000 Blazes	65.35/ blaze	32,67,500/-
4.	Sale of grass & Grazing fees	-	-	10,000/-
5.	Timber and other forest produce removed from the forests by consumer/purchasers other than HPSFC.	-	-	60,000/-
	Revenue from damage of Forest Produce as Compensation & Penalty	-	-	1,45,000/-
7.	Rent of buildings.	-	-	1,00,000/-
8.	Receipt from registration fee.	-	-	1,26,000/-
9.	Export permit fee.	-	-	13,200/-
10.	Receipt from seedlings distribution.	-	-	29,000/-
11.	Other Misc. revenues	-	-	2,86,000/-
			<b>Total:-</b>	<b>85,55,500/-</b>

**2.15.5.2. EXPENDITURE:** -The estimates of annual expenditure are given in **Table 2.15.3** below:

**Table: 2.15.3. Estimated Future Annual Expenditure**

Sl.No.	Particulars	Estimated Expenditure (Rs)
1	2	3
<b>A.</b>	<b>Establishment</b>	
1.	Salary of staff including medical allowances/ reimbursement.	1,90,00,000.00
2.	T.A.	2,00,000.00
3.	Medical expenses.	2,00,000.00
4.	Uniform/Liveries	20,000.00
5.	Contingencies and office expenses	2,80,000.00
6.	Maintenance of vehicles.	2,00,000.00
7.	Professional and law charges.	2,000.00
<b>B.</b>	<b>Conservancy Works:</b>	
1.	Marking and numbering	25,000.00
2.	Demarcation and Maintenance of boundaries	50,000.00
3.	Construction of new	
	a) Buildings	4,00,000.00
	b) Roads	25,000.00
4.	Repair/maintenance of	
	a) Building	1,70,000.00
	b) Roads	50,000.00
	c) Compound.	25,000.00
5.	Fire protection of forests.	50,000.00
6.	Raising of plantations and subsidiary operations	10,00,000.00
7.	Maintenance of old plantations	12,00,000.00
8.	Material and supplies	3,00,000.00
9.	Removals of forests produce from forest by Govt. agency.	90,000.00
	<b>Total Expenditure:-</b>	<b>2,32,87,000</b>

**Abstract of annual future revenue and expenditure:**

Revenue	(Rs.)	85,55,500/-
Expenditure	(Rs.)	2,32,87,000/-
Deficit	(Rs.)	(-) 1,47,31,500/-

**2.15.6. COST OF THE PLAN:** -The expenditure incurred on the preparation of this plan is shown in table 2.15.4 below.

**Table: 2.15.4.Cost of preparation of this plan**

<b>Sl.No.</b>	<b>Particulars</b>	<b>Expenditure(Rs.)</b>
<b>1</b>	<b>2</b>	<b>3</b>
1.	Pay and allowances of the staff	64,04,767/-
2.	Medical allowances	80,556/-
3.	Travelling allowances	2,53,592/-
4.	Office expenses	1,65,312/-
5.	Wages on account of enumeration.	22,53,175/-
6	Motor vehicle	1,36,004/-
7.	Material and supply	20,500/-
8.	Rent Rate and Taxes	2,36,630/-
9.	Maintenance of buildings	17,000/-
10.	Liveries	5,100/-
11.	Other charges	6,000/-
	<b>Grand Total:-</b>	<b>95,78,636/-</b>

The total area covered under this plan =38,805.51 ha

Therefore, per ha cost of revising this working plan comes to Rs.247/-

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## CHAPTER-XVI

### SUMMARY OF PRESCRIPTIONS

**IMPORTANT PRESCRIPTIONS:** The important prescriptions and suggestions of the working plan are as under:

#### 2.16.1. CHIL WORKING CIRCLE

Heading	Prescription/suggestion	Paragraph
1	2	3
Felling series	Three viz. (i) Felling Series - I (ii) Felling Series - II (iii) Felling Series - III	2.2.3
Silvicultural system	The Irregular Punjab Shelter wood System	2.2.8
Choice of species	Chil	2.2.9
Rotation and conversion period	120 years	2.2.10
Regeneration period	30 years	2.2.11
Periodic Block	Four in F.S. I & III, Three in F.S.II	2.2.13
Yield from Felling Series-I:		
P.B.I	1500 cum.	2.2.16.1.1
P.B.IV	2000 cum.	2.2.16.1.2
Yield from Felling Series-II		
P.B.I	500 cum.	2.2.16.2.1
P.B.IV	400 cum.	2.2.16.2.2
Yield from Felling Series-III		
P.B.I	400 cum.	2.2.16.3.1
P.B.IV	600 cum.	2.2.16.3.2
Method of executing fellings		
P.B.I	Guidelines	2.2.17
P.B.II	No felling except salvage removal	2.2.18
P.B.III	Guidelines given	2.2.19
P.B.IV	Guidelines given	2.2.20
P.B. U.	Guidelines given	2.2.21
Sequence of fellings	Laid down	2.2.22
Subsidiary silvicultural operations in P.B.I	Prescribed	2.2.23
Fire protection and control burning	Discussed	2.2.24.3
Resin tapping	Discussed	2.2.25
Right holders demand for TD	To be granted from PB-I and PB-IV only.	2.2.26
Regeneration assessment survey	In felled areas in every alternative year at least for 10 years.	2.2.27

### 2.16.2. BAN-OAK WORKING CIRCLE

Felling series	Two viz. (i) Depot (ii) Preservation	2.3.3
Silviculture system	The Indian Irregular Shelter wood System	2.3.8
Choice of species	Ban	2.3.8.1
Rotation and conversion period	120 years	2.3.8.2
Allotment to PBs	Four PBs in Depot Felling Series.	2.3.9
Calculation of yield	Calculated for academic interest only.	2.3.10
Yield from F.S.I,& IV	No yield prescribed	2.3.10.1& 2.3.10.2
<b>Method of executing fellings</b>		
P.B.I	Guidelines given	2.3.11
P.B.IV	Guidelines given	2.3.11.1
Subsidiary silvicultural operations.	Prescribed	2.3.13
Sowing and Plantation Programme	Suggestions have been made to improve the regeneration in Ban oak areas.	2.3.13.2
Techniques of Artificial regeneration of Ban Oak	Seed collection, pretreatment of seed and planting in the fiel prescribed.	2.3.14
Lopping and lopping rules.	Lopping cycle and rules prescribed.	2.3.16.4
Exercise of other Rights.	Laid down.	2.3.17

### 2.16.3. PLANTATION WORKING CIRCLE

<b>Plantation series</b>	Four (i) Plantation Series-I (ii) Plantation Series-II (iii)Plantation Series-III (iv) Plantation Series-IV(Road & Railway) side strips	2.4.3
Silviculture system	Modified clear felling system with artificial regeneration	2.4.7
Choice of species	Discussed	2.4.8
Yield regulation	By area	2.4.11
Sequence of felling.	Laid down	2.4.12
Method of executing fellings.	Rules laid down.	2.4.13
Sequence of Planting.	Laid down	2.4.14
Artificial regeneration.	Discussed.	2.4.16
Treatment of existing plantations	Guidelines given	2.4.16.1
Nursery and planting techniques.	Discussed for main species.	2.4.16.3
Maintenance and after-care of plantation areas.	Discussed.	2.4.16.3.2
Other regulations	Discussed.	2.4.17

**2.16.4. PROTECTION WORKING CIRCLE**

Analysis and valuation of crop.	Status of stock maps and area under different species given.	2.5.5
Silvicultural System	Not prescribed.	2.5.6
Rotation and exploitable diameter.	Not prescribed.	2.5.7
Yield.	Not prescribed.	2.5.9
Closure and planting programme in blanks and poorly stocked areas.	Laid down.	2.5.13
Subsidiary Silvicultural operations.	Discussed.	2.5.14
Control of Invasive Alien Species.	Discussed.	2.5.15
Soil and water conservation.	Discussed.	2.5.16

**2.16.5. GRAZING (OVERLAPPING) WORKING CIRCLE**

Nomadic and migratory grazing.	Discussed.	2.6.10
Present status of grazing-lands.	Discussed.	2.6.12
Carrying capacity of grazing-lands.	Discussed.	2.6.21
Problems in management of grazing-lands.	Discussed.	2.6.22
Improvement and management of grazing-lands. Discussed.	Discussed.	2.6.23

**2.16.6. WILDLIFE (OVERLAPPING) WORKING CIRCLE**

Management and organization.	Discussed.	2.7.4
Management measures for wildlife management.	Discussed.	2.7.5
Wildlife Sanctuary.	Transferred to Wildlife Wing.	2.7.7
Survey and data collection.	Discussed.	2.7.13

**2.16.7. JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE**

The need for Joint Forest Management.	Discussed.	2.8.2
Steps involved in Joint Forest Management.	Discussed.	2.8.4
Approach to be adopted in implementation of Joint Forest Management Schemes.	Discussed.	2.8.5

**2.16.8. N T F P (OVERLAPPING) WORKING CIRCLE**

Contribution to income and quality of life in rural areas.	Different aspects of propagation, collection and parts used.	2.10.3
Rehabilitation Plan.	Discussed.	2.10.5

**2.16.9. THE FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE**

<b>Causes of forest fires.</b>	<b>Discussed and given.</b>	
Special fire risk zones.	Identifies and given.	2.11.2
Management of fire protection.	Discussed.	2.11.6
Construction of Fire watch Towers.	Proposed.	2.11.7
		2.11.7.1.10
Triennial programme of control burning.	Discussed and laid down.	2.11.7.1.11

**2.16.10. MISCELLANEOUS REGULATIONS**

Repairs to roads and paths	To be maintained properly	2.13.1
Buildings	New buildings suggested	2.13.2.1
Fire protection	Measures suggested	
Maintenance and checking of boundaries	Regular repair and check suggested.	2.13.7
Fire Protection.	Prescribed.	2.13.11
Grant of trees to right holders	Given.	2.13.14
Encroachments	To be ejected	2.13.18

**2.16.11. CONTROL AND RECORDS**

Compartment History Files.	To be maintained regularly.	2.14.1
Control Forms.	To be maintained regularly.	2.14.2
Plantation and Nursery Journals.	To be maintained regularly.	2.14.3
Forest Guard Manual.	Fresh preparation suggested.	2.14.4
Divisional Note Book.	To be maintained.	2.14.5
Record of Machinery.	To be maintained.	2.14.6
Fire Record.	To be maintained.	2.14.7
Register of Roads, Buildings, Paths and Fire-lines.	To be maintained.	2.14.8
Register of Regeneration Assessment Survey.	To be maintained.	2.14.9

**2.16.12. ESTABLISHMENT AND LABOUR**

Establishment	Requirement given and highlighted.	2.15.1
Creation of new Range.	Suggested.	2.15.2
Labour.	Discussed.	2.15.3
Training.	Suggested.	2.15.4

**2.16.13. FINANCIAL FORECAST AND COST OF PLAN**

Future Yield.	Annual expected yield in different working circles.	2.16.4
Future Revenue and Expenditure.	Anticipated Revenue and Expenditure tabulated.	2.16.5
Cost of the Plan	Total cost of the Plan tabulated.	2.16.6.

(-Sd-)  
(Raghubir Singh Banyal, IFS)  
Working Plan Officer  
Palampur Forest Division.

(-Sd-)  
(Dr. Tejinder Singh, IFS)  
CCF (Working Plan & Settlement)  
Mandi.

(-Sd-)  
(Sh. S C Shrivastav, IFS)  
Addl. Pr. CCF (WP&S) HP  
Shimla.

(-Sd-)  
(Sh. R K Gupta, IFS)  
Pr. CCF (T) HP  
Shimla.

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**Copy of approval accorded by Addl. Principal Chief Conservator of Forests (Central) GOI, Chandigarh**

GOVERNMENT OF INDIA  
MINISTRY OF ENVIRONMENT & FOREST

F.No.13-7(3)/1997-ROC/2343

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DAKSHIN MARG, CHANDIGARH-160030  
Dated 26<sup>th</sup> March, 2012

To

The Additional Chief Secretary (Forests)  
Government of Himachal Pradesh,  
Forest Department,  
Talland, Shimla, Himachal Pradesh.

**Sub: - Approval of Working Plan for the Forests of Palampur Forest Division (2010-2011 to 2024-25).**

**Ref: Pr. Chief Conservator of Forests, Govt. of Himachal Pradesh letter No.2614 dated 27<sup>th</sup> February, 2012.**

**Sir,**

The working plan for the Forests of **Palampur Forest Division** (2010-2011 to 2024-25) has been examined in accordance with the provisions of Forest (Conservation) Act, 1980 as amended till date, National Working Plan Code, guidelines issued by Government of India, Ministry of Environment and Forests, New Delhi from time to time, National Forest Policy 1988 as well as orders dated 12<sup>th</sup> December 1996 of Hon'ble Supreme Court of India in PIL WP(C) 202 of 1995 read with WP(C) 171 of 1996.

After careful consideration of the proposed Working Plan, approval of the Competent Authority is hereby conveyed under Section 2 of the Forest(Conservation)Act,1980 subject to observance off the following conditions:-

1. The approval shall be effective from the date of issuance of this communication till 31.3.2025.
2. All the provisions of the Forest (Conservation) Act, 1980 and various Rules & Guidelines issued under the Act shall be strictly enforced.
3. Yield obtained from dead, dry & salvaged timber will form part of prescribed yield and in case prescribed yield has been achieved from dead & dry volume, no further felling will be carried out. Yield from dead, dry & salvaged timber must not exceed the prescribed yield in the working plan.
4. All the fellings must commensurate with regeneration and no fellings would be permitted unless funds for regeneration are available. In this regard, orders of Hon'ble Supreme Court of India will be strictly complied with.
5. Intensive protection measures against fire, biotic interference and encroachment in Forests shall be taken up.

6. All the prescriptions prescribed in the working plan regarding plantation, protection and development of the Forest Area will be strictly followed and any change in the prescriptions will be treated as deviation for which prior approval of competent authority will be obtained.
7. Sufficient budgetary allocations be ensured for timely implementation of various prescriptions regarding protection, regeneration and development of the Forests.
8. Mid term review of the Working Plan will be taken up on between 7<sup>th</sup>& 8<sup>th</sup> year of the plan period.
9. The work on revision of Working Plan shall be taken up well in advance so that the revised plan is ready before expiry of the current Working Plan.

The central Government reserves the right to review/modify or withdraw this approval at any point of time depending upon the management needs and any other guidelines of the Ministry of Environment and Forests, Government of India or Hon'ble Supreme Court of India.

**Yours faithfully**  
**-Sd-**  
**(S.K.Sehrawat)**  
**Addl. Principal Chief**  
**Conservator of Forests**  
**(Central)**

**Copy to:-**

- 1 The Addl. Director General of Forests (FC), Ministry of Environment & Forests, Paryavaran Bhawan, CGO complex, New Delhi.
- 2 The Pr. Chief Conservator of Forests, Govt. of Himachal Pradesh, Forest Deptt., Talland Shimla, Himachal Pradesh.
- 3 The chief Conservator of Forests, Working Plan & Settlement Mandi, Himachal Pradesh.
- 4 The Conservator of Forests, working plan Dharamshala, Himachal Pradesh.
- 5 The Divisional Forest officer-cum-Working Plan Officer, Forest Division and District Kangra.
- 6 Guard file.

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